COMPUTERWORLD

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3% Off Hardware

IBM Software Shock: Program Licenses Can Cost User More Than a High Speed Printer

ARMONK, N.Y. – IBM's expected unbundling announcement shook computer users when they realized that having programs (including ones such as Cobol, PL/I, or Fortran) might cost them as much in monthly rental as a major unit such as a high-speed printer.

Charges for application programs had been expected, but many people had also expected that languages and sorts would be either free or, alternatively, very low priced. In fact, IBM exempted only system control programs (operating systems) from software charges, and specifically included sorts, conversation aids, and compilers.

No certainty as to the cost of software to installations was possible, because IBM announced only the prices – which it said would "vary widely" – on 18 programs (see list on page 4). However, this included one language-like facility, GIS, at $1,500 a month. This price is considerably above the cost of most of the System 360 printers.

Contradictory Reactions

Industry reaction to the announcements came quickly. It was both contradictory and fierce. Howard S. Levin, president of Levin-Townsend, which has sued IBM on antitrust grounds, said that his company's profits for the year would be reduced because the firm would have to cut hardware leasing prices (IBM has reduced hardware prices by an average of 3%). He said that since his company had bought and paid for services – including user training and systems engineering – which the new practices will take away, he considered the situation to be "totally unfair."

Best Possible Alternative

By contrast, Frank Wagner, senior vice-president of Informatics, said that the separate pricing of computers and services was "probably the best of possible alternatives." Wagner anticipates that Informatics will no longer have competition from IBM with so-called "free services."

Not unsurprisingly, the Justice Department declined comment on IBM's announcement, which was generally accepted as a move to weaken the department's case against IBM. Altogether, there are five antitrust suits against IBM that recite a variety of alleged violations of antitrust laws and particularly stress package pricing.

Alan Shalov, general counsel for Data Processing Financial and General Corp., said that his firm's antitrust suit had certainly not been wiped out. "There are

(Continued on Page 4)

Cmdr. Hopper Honored

Navy Cmdr. Grace Hopper receives the DPMA's first Man of the Year award from DPMA President Charles L. Davis. She was honored for her contributions to the computer sciences. Other stories about the DPMA show in Montreal appear on inside pages.

New Largest System Has Mature Software

MINNEAPOLIS, Minn. – The world's most powerful computer with matured software was announced last week by Control Data Corp. in an intriguing statement that suggested new ways of handling both memory expansion and processing-power upgrading without involving the user in unwelcome side effects.

The system, the CDC 6700, will be available in the second quarter of next year. It is 40% more powerful than the superscale 6600, but costs approximately only 10% more.

Control Data already has announced the 7600, which is four times faster than the 6600. However, so far it has been delivered only without software and is not scheduled for delivery ahead of the 6700 with software.

In place of the usual upgrading method of increasing the speed of a computer, the 6700 has added a second 6400-type central processor so that programs can be run on either of the two systems. The software for controlling this has already been operational on the 6500 multiprocessor for some time. To handle the requirements for additional memory, instead of increasing the amount of expensive central memory that holds additional programs, Control Data has relied entirely on the use of its cheaper extended core memory. It has not increased the central memory over the original 131K system.

The second central processor, which has been added to the old 6600 to make the 6700, runs exactly the same programs as the 6600 central processor. However, it is not quite as powerful as the 6600 processor, because a number of the features, including the multiple instruction units and the look-ahead stack for optimizing performance, have not been included. It has, however, been well tested on 6600 programs, as it is the processor from the stripped-down 6600 which has been marketed for some years as the 6400.

The Scope operating system

(Continued on Page 2)

New Marketing Gimmick: Free Software Package

By Peter L. Briggs
CW Staff Writer

KENMORE, N.Y. – You've heard a lot about so-called "free" software. Well, someone has finally decided to provide real free software. Dataware Inc. is offering, to anyone who will accept a visit from the company's salesman, a free management inquiry system formally retailing for $3,000.

Designed to run on the S/360, MIS requires card-reading equipment, 32K, and disks for data storage and sorting work files. MIS is actually a report generator, as well as a data-inquiry package, providing a simplified language for report specification and extensive capabilities to express logical relationships between various elements of data.

There are six types of control statements, the parameters of which control the execution of the generated program. Desired titles, record descriptions, selection criteria for reports, summary fields, and file-definition information can be specified.

The main service offered by the company, located here at 3514 Delaware Ave., is proprietary software development. The firm is currently offering several packages including a Cobol Analyzer, a debugging aid for Cobol programs; Cologen, a Cobol precompiler allowing the specification of program logic as decision tables; DTP IV, a full-scale decision-table processor; and CMFLS, a library system of specialized Cobol macros permitting the standardization of most data processing functions.

Several recipients of the MIS told CW they liked it. But they pointed out that they were, in the main, already using RPG for their reports and, therefore, did not have that much use for the package.

Change Marks Start of CW's 3rd Year

NEWTON, Mass. – Computerworld celebrated its second anniversary last week by moving into larger quarters for the fourth time. The new offices, located at 797 Washington St., more than doubles the office area available to the various departments of the company. It also permits the consolidation of [illegible]rial, production, advertis[illegible] circulation for the first ti[illegible].

[illegible]uterworld began in June, [illegible], working out of the second floor at 14A Eliot Street in Cambridge, Mass. The site was conveniently located over an Indian Restaurant, permitting the employees to enjoy a variety of exotic odorous sensations. By September, 1967, CW was housed in a third floor walk-up at 129 Mt. Auburn St. in Cambridge.

In January, 1968, Computerworld moved to brand new headquarters at 60 Austin Street, Newtonville, but the publication's rapid growth required the new, larger space within eighteen months.

On the Inside

Input Devices Shine at DPMA Show – *Page 10*

A Look at Memories of the Future – *Page 8*

Editorials	8	New Products	6
Education	7	Software	15
Financial	17	Stock Table	18

User May Be Infringing Patents When He Loads His Programs

NEW YORK – A long-feared possibility – that computer users might be infringing patents when they run their programs – has come a step nearer. A firm with a 1948 patent on disks served notice that it believed some 200 users of on-line inventory control systems on Control Data, SDS, and Honeywell computers were liable for damages.

The essence of the claim by Technitrol, Inc. is that users of computers who have programmed them to act as on-line inventory control systems are infringing the patent, unless they, or their computer manufacturer, has obtained licenses. A number of computer manufacturers have obtained such licenses, but Control Data, Honeywell, and Scientific Data Systems have refused to admit they need them.

The federal rule under which Technitrol is attempting to convert its patent infringement actions into a so-called class action requires that the representation be such "as will fairly insure the adequate representation of all." Unless the interests of the absentees are protected fairly by the representatives, the court cannot entertain such a class action because it does not meet constitutional standards of due process, according to legal sources.

Technitrol may have some difficulty meeting these standards, since it seeks to name as representative of users three computer manufacturers whom it has already sued as infringers of its patent.

The interests of the user are not necessarily the same as those of a manufacturer. This has been shown by several recent cases such as that of Food Fair Inc. against IBM and the Justice Department's antitrust suit against IBM which takes the point of view of the consumer.

The Technitrol legal notice appears on page 13B.

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Mature System Software Ready With CDC 6700

(Continued from Page 1)

handles the monitor and executive functions in this dual processor system and includes all the features of the present 6000 series Scope operating system.

Available software includes Cobol, Fortran, and Algol compilers; Export/Import for remote batch processing; Intercom for remote conversational terminals; Sort/Merge; Pert/Time; Simscript for simulation programming; Apt for numerical control processing, and Optima for linear programming.

The 6700 uses the 6000 series peripheral and input/output equipment, including remote terminal devices and displays that have helped make the 6000 series highly adaptable to real-time, on-line, and time-sharing systems.

Control Data has now delivered over 125 of the 6000 series systems throughout the world. It was originally delivered as the 6600 in 1964. Since then, other program-compatible systems, such as the 6400 and the multiprocessor 6500, have been introduced.

DATA COMMUNICATION IDEAS?
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$1,890/Mo. Tape-to-Film System Can Provide Printing Flexibility

MONTREAL – A new system that takes magnetic tape records directly onto microfilm without intermediate processes was introduced by Burroughs Corp. during the Data Processing Management Association show. Called BCOM, it provides for growth in printed faces – (three character sizes are possible) and in the placing of the image. Placing can be handled graphically.

Some graphic capability is possible, and copies of display records can be searched for and reproduced from film onto either paper or film.

Lease prices range from $1,890 to $3,290 per month.

The corporation says the system can record computer output directly on microfilm up to 40 times faster than a line printer, and that the 100-foot microfilm cartridge can hold data from almost a complete 2,400-foot magnetic tape.

Burroughs President Ray W. Macdonald also emphasized the system's portability and compactness in storing and using microfilmed records, in comparison to the bulkiness of computer printout.

"These advantages are particularly important for uses such as archieval storage where information is referred to infrequently," Macdonald said.

BCOM (Burroughs computer output to microfilm) is aimed at applications that require greater speed and economy in production of computer-generated records than can be achieved with computer line printers.

Typical applications for BCOM might include lists, tables, and tabular records for airlines, banks, credit card companies, educational institutions, finance companies, governmental agencies, hospitals, insurance companies, manufacturers, oil companies, publishing firms, retail companies, stock brokerage firms, and utilities.

Purchase prices for BCOM systems range from $85,000 to $125,000, depending upon the degree of capability required by the customer. First deliveries are expected to begin in the third quarter of this year.

Technical Data

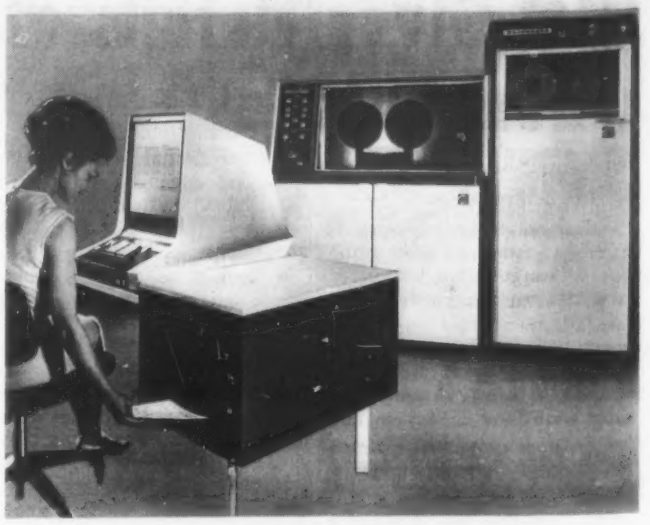
Information is transferred from magnetic tape by the BCOM unit and is displayed in printed page format on a CRT. Data is photographed by a high-speed microfilm camera either as lines of information or overlaid on replicas of business forms.

The user has a choice of three character sizes for display of information: 135 characters per line with 64 lines per page; 67 characters per line with 32 lines per page, or 45 characters per line with 21 lines per page. Either 64-character or 96-character alphanumeric sets may be used.

The user also has a choice of either 16-millimeter microfilm in 1,000-foot rolls, or a 105-microfiche camera. Among other options is a magnetic tape search program for selective recording.

Burroughs offers four readers for locating and viewing information. Readers include a basic reader, a frame count reader with 21- or 26-bar coding, a reader compatible with random access coding, and a microfiche reader.

When copies of information displayed on a viewer are desired, a Burroughs electrostatic printer will make 8-1/2 in. by 11 in. dry copies on paper. Either positive or negative image copies are available, and variable printing density can be controlled by the operator.



Data from the tape drive, right, is photographed onto microfilm in the middle unit. Individual frames can be retrieved and displayed by the film viewer and hard copies made.

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IBM Gives Details of New Separate Pricing Policy

ARMONK, N.Y., June 23 – The IBM data processing division's new way of doing business, announced today, establishes prices for products and services in three areas:

- *Systems engineering services*, offered to assist customers in the installation and application of IBM data processing systems;
- *Data processing education*, which provides more than 50 professional-level classroom courses to help IBM equipment users train their employees; and
- *Program products*, offered for monthly charges under a license agreement.

The company also announced custom contract services, a new offering. Under a custom contract, IBM will assume responsibility for performance of specified tasks, such as the design and installation of a data processing system.

For example, a custom contract might call for IBM to develop an inventory management system and, upon completion, to turn it over to the customer for operation. It could cover systems design, selection of programming, and training of customer employees.

Custom contract services are an extension of IBM's experience in special contract work, done in the past by the company's federal systems division. For several years the federal systems division has performed contract work for the federal government. Some examples are computer installations at Nasa's Manned Space Flight Center in Houston and the Federal Aviation Administration's air traffic control system.

Systems Engineering Services

IBM systems engineering services, available for a charge, are provided to assist a customer in the installation and application of his IBM data processing system and to increase the customer's overall data processing proficiency. Services are provided for a range of customer activities, including systems analysis and design, preparation of application flowcharts and block diagrams, program writing and testing, and installation planning.

Systems engineering services are offered on the basis of a specific scope of effort – or definition of work to be done – agreed upon by IBM and the customer. The level of systems engineering skills required depends upon the complexity of the equipment involved and the way it is used in an operating environment. There are three skill classifications:

- Basic systems, which include machines such as unit record equipment, System/360 Model 20, and the 1130 computing system;
- General systems, which include data collection and data communication systems, optical readers, and on-line banking terminals; also System/360 Models 25 through 50 and the 1400- and 7000-series equipment when used for batch processing, limited multiprogramming or general teleprocessing;
- Complex systems, which include System/360 Models 65 through 85 and the 1800 data acquisition and control system; also all systems when used in such operating environments as general multiprogramming, multiprocessing and complex teleprocessing.

Systems engineering services will be scheduled in half-day units.

Charges for systems engineering services provided to any customer prior to Jan. 1, 1970, will be waived to the extent that such services are equivalent to the assistance IBM and the customer had mutually planned before this announcement.

Data Processing Education

More than 50 professional-level classroom courses are offered for a charge in IBM's data processing education program. Also available for a charge are about 40 additional courses for private study in the form of programmed instruction or audio and video tapes or supervised study halls.

The program is designed essentially to help users of IBM equipment train their data processing managers, systems anaiysts, programmers, and operators. Courses will be held at the data processing division's 25 education centers.

Customer education courses announced before today will be provided without charge until Jan. 1, 1970, to users of IBM data processing equipment.

Professional courses will be offered as lectures in classrooms or as programmed instruction for private study. Programmed instruction study halls, with advisor assistance, also will be available.

Charges for professional courses vary widely according to course content. Some examples of classroom courses and prices are:

- "System/360 Operating System Advanced Coding," a course for systems programmers on how to use systems facilities to define, code, and test programs written in assembly language ($460 per student);
- "1800 Time Shared Executive System Specifications," intended to teach programmers and systems analysts to write programs in Fortran for execution on the 1800 data acquisition and control system ($220 per student); and
- "System/360 Continuous System Modeling Program," designed to teach engineers and scientists how to simulate a continuous process on a computer and interpret the results ($170 per student).

The professional courses are intended primarily for users of IBM equipment. IBM does not intend to solicit applications from the general public, but will accept applications from anyone meeting course prerequisites. All applicants must meet standard entrance requirements, such as prior data processing education or equivalent experience. For some courses, entrance examinations will be given.

Courses designed to meet special education needs may be obtained at specific price quotations. IBM systems engineers also may provide special instruction at established systems engineering rates.

Classroom courses designed to train operators in the use of keypunch and unit record equipment are being discontinued, effective June 23. This type of training is provided by many private and public schools, and a large amount of self-study material on keypunch and unit record equipment is available from IBM and other sources.

For courses in basic programming, unit record equipment, and console operation, IBM's materials of instruction, including course outlines, are available to anyone at established prices.

Data processing instruction designed to introduce IBM equipment to users and prospective users will be provided without charge, as in the past. This includes:

- Systems features instruction, containing basic information users need to understand IBM data processing systems;
- Industry and product seminars which demonstrate new IBM products and services; and
- Customer executive seminars which demonstrate computer potential.

Programming

New IBM programming that is an essential part of a data processing system and fundamental to its operation and maintenance is called *system control programming*. It serves as an interface for IBM program products as well as user programs and is directly involved with the management of available system resources. System control programming controls various input/output devices and the execution of programs. System control programming announced in the future will be provided, installed, and serviced in IBM equipment without charge.

Most future IBM computer programs will be offered at monthly charges. Called *program products*, they will be provided to anyone who signs a license agreement. A license for each program product will authorize a customer to use it for a charge on a designated central processing unit (CPU). The customer may use the same program on additional CPUs by paying for an additional license for each CPU.

Program products will include application programs, conversion aids, sort programs, and language processors.

Charges for program products will vary widely. Monthly charges have been established for 18 programs previously announced but not yet available. Some examples are:

- Generalized Information System, which will enable users to get information from a computer by asking it questions in a simple, English-like language ($1,500 a month);
- Text Processor: Pagination/360, which will allow publishers and printers to edit text and do page layouts using a computer ($450 a month); and
- Power System Planning, which will allow electric utility engineers to simulate the various conditions affecting power system expansion and change on System/360 ($300 a month).

All programs currently in IBM's program library continue to be available as in the past. Services for those that have been supported by IBM (Type I and Type II programs) remain unchanged during a transition period ending Dec. 31, 1969. Services for programs include defect analysis and temporary bypasses.

Program products each will be offered with one of the three programming services classifications:

- Class A includes, without charge, defect analysis at the customer's location, reporting results of such analysis to a central programming service and making temporary bypasses, when required, by field engineering division personnel.
- Class B includes the central programming service without charge, with the field services provided by field engineering personnel for a charge.
- Class C, for which field engineering assistance is available for a charge.

Each individual program product at its announcement will be assigned a service classification. Currently available IBM programs have been assigned service classifications which become effective Jan. 1, 1970, after the transition period.

Field engineering assistance also will be offered for charge for non-IBM programming used on IBM data processing equipment. This emergency assistance includes diagnosis of programming problems and correction when the work can be done in eight hours or less. For work requiring more than eight hours, systems engineering services are available for a charge.

Unbundling Shock: Programs Can Cost More Than a Line Printer

(Continued from Page 1)

many other issues involved, including damages for past actions," he said. "DPF&G intends to study the move very carefully."

Honeywell, Control Data, and Univac all followed the same path, saying that they wanted to study the announcement before commenting.

Other Changes

As well as the software prices, IBM also announced that it was going to charge for systems engineering, education courses, and custom contract services.

Transition Period

A six-month transition period, ending Dec. 31, 1969, is being allowed during which customers and IBM can acclimate to the new operations. IBM said also that all programs currently available from the program library will remain in the public domain and available as in the past.

Separately Priced Programs

The following Type 2 application programs are the first for which IBM has announced prices. The prices are monthly charges per CPU.

1130/1800 System Programs	Per Month
Charge Materials Allocation Processor	$20
Linear Programming Systems	$30

System/360 Programs	Per Month
Advanced Life Information System(DOS), ver. II	$500
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Array Processor(OS)	$300
Customer Information Control System(OS)	$600
Generalized Information System(OS)	$1500
Graphic Analysis of Three-Dimensional Data(OS)	$300
Information Management System(OS)	$600
Medical Information System Programs(DOS), ver. II	$50
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Rigid Frames Selector Program(OS)	$25
Text Processor-Edit/360(DOS)	$250
Text Processor-Pagination/360(DOS)	$450

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Macdonald Says Burroughs Will Extend Separate Pricing to Large DP Systems

DETROIT – Burroughs, which has been experimenting with the separate pricing of hardware and software on a limited scale, will extend the policy to its large EDP systems, the company announced last week. Details of the separate pricing of hardware, software, and services will be released shortly, the company said.

Burroughs President Ray W. Macdonald said that present and prospective users of large Burroughs systems were being given the option of continuing under present contracts or of converting to a new unbundled pricing plan.

Burroughs "unbundled" its L2000 billing computer in February and later extended the policy to the TC500 terminal computer and the TC700 teller terminal. Effective July 1, the policy is being extended to the E4000 and E6000 accounting systems, Burroughs said.

This "is part of a program that may encompass a variety of additional electronic business machines, terminal computers, and electronic data-processing systems," Macdonald said.

He added that Burroughs' experience with the "very successful L2000 program has reinforced our conviction that separate pricing for software and services, and for hardware, is feasible and advantageous for both Burroughs and our customers.

"We feel the customer should know how much he is paying for basic equipment, and that he should have complete latitude in selecting the amount of software that fits his requirements," he said.

Under the E4000 and E6000 price separation plan, prices for hardware will be lowered, and customers will be able to choose from four basic methods in identifying costs for applicational software:

1. Customized programming can be written by a Burroughs applicational software representative according to the customer's specific requirements.
2. The customer can select standard applicational programs supplied by Burroughs.
3. The customer can select a standard program and have it modified for his application.
4. The customer can do his own programming after receiving training from Burroughs.

The company said several outstanding advantages accrue to the customer through the ability to identify software costs separately from hardware prices:

- He will pay only for the amount of programming required for his particular applicational problem.
- He will pay only once for a program that can be used in multiple-machine installations.
- Programming costs are separated from capital expenditure cost if the equipment is purchased.
- Programs are written by Burroughs applicational software experts.

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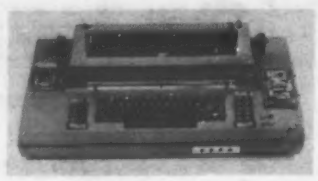
Portable Terminal Handles Tape, Edge-Punch Cards

PALO ALTO, Calif. – A portable terminal that features paper tape and edge-punch card I/O, as well as the control functions and hard-copy output of a keyboard/printer has been demonstrated.

The terminal, designated Model 1051 data terminal, is S/360-compatible and can replace IBM terminals or operate in mixed mode with them, the company says.

The manufacturer, Dura division of Intercontinental Systems, Inc., says that its low cost makes the 1051 especially desirable for multiple-terminal installations, operating in both terminal-to-terminal and terminal-to-computer communications over either public or private lines.



The unit has a standard feature, Non Print/Non Escape, which allows the operator to transmit or receive without printout, should that be desirable or required for maintenance of security.

Options include automatic ribbon shift (to allow color identification of messages received and transmitted), half-line spacing for subscripts and superscripts, the edge-card capability, and other readers and punches.

The company is located at 2600 El Camino Real, Palo Alto, Calif. 94306.

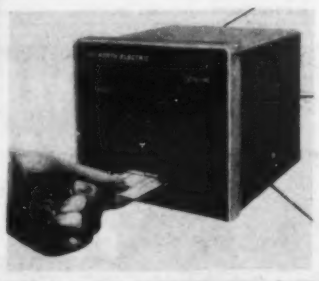
NEW PRODUCTS

Attendance Recorder

The Attendance recording system features data collection at a central point with output compatible with a number of different computers, on magnetic tape, punched cards, or hard copy.

The employee carries a small (2-1/8-in. by 3-3/8-in.) plastic card, containing only his own identification.

The card is inserted into a special reader and transmitted,



in Touch-Tone signal, to a receiving station.

At that point, the time is clocked and the full information is output in computer-usable form.

Each input station, consisting of badge reader, station identifying program plug, and line concentrator, costs $723, or can be leased for $36 per month.

A receiving station has a receiver that converts the sound signal to digit and a scanner. A receiving unit costs $1950, including a digital clock that records hour and minute. The latter unit, which leases for $97.50 per month, is theoretically capable of multiplexing an unlimited number of lines, according to the company.

The system components are in stock.

North Electric, Galion, Ohio 44833.

Low-Priced Tape Drives

A recent entry in the bargain-priced magnetic tape sweepstakes has the highest data rate of any tape unit in the low-cost category, claims the company.

The Model 6X40 is actually more like a series; there are three different forward speeds, 37.5, 25, and 12.5 in./sec.

The manufacturer, Peripheral Equipment Corp., has priced the 37.5 in./sec unit at $4,750 in single orders, or $3,750 in quantities of 100 or more. The slower drives are scaled down from there.

The company offers both 9-track, 800 bits/in., and 7-track, dual-density versions, compatible with IBM 729 or 2401 (Model 1) and 2415 drives.

There are also units designated 6X60; these lack read-after-write capability, which is said to be built into the 6X40s.

Peripheral Equipment Corp., 9551 Irondale Ave., Chatsworth, Calif. 91311.

Addressing Machine

A new table-top addressing machine applies computer-printed forms as address imprints or labels to 7500 documents or mail pieces per hour.

The Mod I distributor can be rented for $90 per month, with a meter charge determined by the number of addresses applied, according to the manufacturer, Cheshire, Inc.

With the Mod I distributor, firms can use their own data processing system to store, update and print-out addresses or other data on wide computer forms at high speeds. This eliminates the need for slow plate or stencil systems and their costly maintenance, the company says.

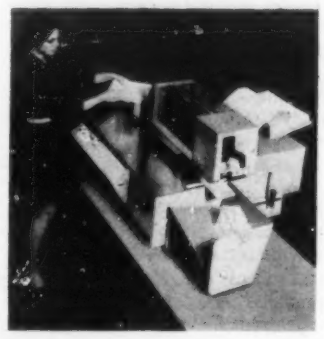
It also provides users greater selectivity from their lists, better list control, and fewer "human errors."

The unit automatically transfers addresses or other data from the computer-printed forms to documents or mail pieces in sizes to 12 in. by 11 in., up to 1/8-in. thick. The machine will also apply heat-activated label forms as crisp, cleanly cut labels without need for liquid adhesive. After addressing, documents and mail pieces are fed into a storage hopper.

Other models also are available.

The self-standing Mod II and Mod III distributors handle sizes to 13 in. by 13 in., up to 1/2-in. thick. The Mod III distributor also automatically separates and stacks mail by Zip Codes, common destinations, and other groups on delivery conveyor after addressing to speed distribution.

Cheshire, Inc., 408 Washington Blvd., Mundelein, Ill. 60060.



Tape Coupler

A punched-tape coupler, said by its developer to put IBM's MT/ST in the photocomposition business, has been announced.

The Model DC-203 is a plug-in, add-on modular unit that translates MT/ST special code and conditions it to perforate tape at speeds up to 40 codes per second in TTS format.

The additional code necessary to bring MT/ST code up to the full TTS code has been accomplished by using the plus-minus key as a supershift.

The system has been placed in production, the company says, with initial deliveries scheduled in June.

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Army Experimenting With CAI Program In Training 20,000 Officer Candidates

FORT BENNING, Ga. – The Army Infantry School has put a battlefield on-line to a computer through CRT terminals for a two-year test of computer-assisted instruction.

More than 20,000 Army personnel will come in direct contact with the computer before the test ends in September, 1970.

The school is using a Honeywell Model 200 computer system, 50 terminals, and its thousands of students to test the system.

The project is the result of a team effort by subject-matter specialists (Army instructors), education specialists at Fort Benning, computer programmers, and Honeywell's electronic data processing division.

The first programs for the project give officer candidates practical experience in directing mortar fire, similar to that acquired at a combat fire-direction center. Students use a plotting chart to zero in on a target.

The 50 CRT units are in a 200-man classroom at the infantry school on the sprawling 285-square-mile base near Columbus in southwest Georgia.

The computer gives the student a problem to solve by displaying it on the CRT screen. The student responds to the computer by keying his answer. He checks it as it appears visually on the screen before him, corrects it, and then dispatches it to the computer by pressing the command key "transmit."

The computer is programmed to react to a wrong answer and to tell the student what he has done wrong. The computer provides remedial instructions and requests the student to perform the work again. After a correct answer, a new problem is displayed on the screen.

William F. Freeman, the civilian manager of the project, says the study for the Continental Army Command will seek to answer three questions:

- What is the best way to use the CRT devices for the practical exercise phase of Army training?
- What are the benefits and problems that arise from computer-assisted instruction?
- What types of practical exercise are best suited for computer-assisted instruction?

For the first classes, the terminals are being used on a one-to-one basis, one student assigned to each. As the experimental program progresses, multiple-student use of the units will be tested – first with two students to each, then with three, and finally with four.

The army is using the control-group method to validate the benefits students derive from computer-assisted instruction.

During the experimental phase, 50 students receive practical experience with the CRT units and 50 students receive training in a conventionally taught practical exercise which has been standard at the infantry school.

Each group – selected to represent men with similar academic skills – receives the same course of instruction for the same number of hours. The practical exercise, with or without the computer, is given on the fourth and eighth hour of the eight-hour instruction period.

An examination at the end of that period seeks to determine which group has learned the most. The men are tested again at a later date to determine which group has retained the most information.

The computer also provides a printed analysis of student performance at the CRT units. In this way, Army instructors hope to determine which portions of their instruction need additional emphasis.

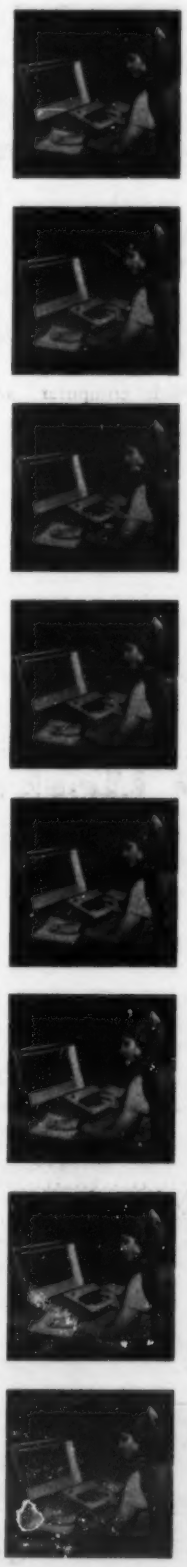
Two practical exercises in directing mortar fire for officer students have been programmed.

A third program has been developed to train enlisted mechanics by practical experience in the use of an Army parts manual. Other programs will be developed during 1969-70.

Freeman said the project will bring three levels of officers and two types of enlisted men into the computer-assisted instruction program.

The effectiveness of these programs as teaching tools will determine what programs the Army will add to the system. Freeman said the object is to test as wide a variety of computer-assisted practical exercises as possible during the two-year period.

Screen, on-line to a Honeywell Model 200 computer, simulates a battlefield for this officer candidate. He uses plotting chart to zero in on target, then keys response to the computer.



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By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as $4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

LOGIC CORPORATION

15 E. Euclid Ave., Haddonfield, N.J. 08033 (609) 428-4626

Editorial

The First Round

A considerable amount of the press coverage given the recent Programmatics case was accurate, but it may have left a wrong impression about the important facts of the case. It was suggested that "IBM won the first round."

In fact, after a hearing in which the technical details of program loading and maintenance and the marketing details of program distribution were examined in court for the first time, the judge went out of his way to consider a key point for the computer industry, the legality of the current marketing practices of the computer manufacturers. He concluded that he could not say with assurance that the practices did not violate the antitrust laws, because the economic situation they set is such that no customer is likely to pay independent suppliers for products he can get free from his computer maker.

It would seem that far from IBM having had the position of the computer manufacturers vindicated in these proceedings, it has instead had an independent member of the judiciary say that the matter is not clear-cut.

It appears to CW that this was not a victory for the status quo, and that it means the industry and users must seriously consider preparing for separate software pricing.

A Welcome for the 6700

The concept of Control Data computers has always been interesting, and it has usually been different. Few companies have followed Control Data's leads, but its commercial success can hardly be ignored.

In the announcement of the 6700, there are a number of items – concepts if you wish – which are almost unique and are of great technical interest.

However, the important ones are those with the greatest user interest. After all, computers are for users.

Control Data has preserved its software from the smaller systems in the 6000 range and has done this without affecting the cycle time or any of the other hardware-programming, so that programs can be held efficiently outside the expensive central memory without affecting the user's programming.

Control Data has, in short, shown that technical capability can often obviate program incompatibilities. The 6700 is to be recommended both for its own merits (it is the biggest system in the world with available software) and for the user safety which it provides. Welcome the 6700.

Challenge to Computers-Part 2

A Look at Memories of the Future

One of the future methods for knocking a few dollars off your data-processing requirements may be the use of memories other than those with which the system was supplied. Such a memory might be useful for [illegible] an old second-generation [illegible] perhaps, third-generation) system. You might need one because you have a new application and have run out of core. You might need one simply because although you could go out and buy more core, your enthusiasm wanes when you look at the price.

Computer manufacturers' core prices are inclined to be high. Here, then, are some of the ways you might handle it.

1 – Enough Addresses?

The first step is to ask yourself if you have enough addresses. If your computer has an address structure that allows you to write up to 9,999, then generally you can address that number of words directly. So, provided you are not using them all, you can add the amount of memory you want.

There is a possible problem here. If your computer is actually addressed in binary, then although you can write up to 9,999 in the address fields, the actual maximum will be 8,192, the highest power of 2 available in four decimal digits. However, this will be a deterrent for only a moment, because you will always know whether your machine is addressed in binary or in decimals.

The makers of binary machines always sell their memory modules as 8K, 16K, 32K, etc., while decimal machines have nice round numbers like 10,000 and 20,000. So just by looking at the price list, you can make this distinction.

The Way to Memory Economy?

- Check the cycle time of your present machine.
- Choose from the manufacturer's catalog the type of memory that has a faster cycle.
- Find out how many physical bits there are in your word, byte, etc.
- Use this to determine how many bits you need and choose the unit that has at least that number.
- Check the addressing structure of your system and find out whether an added memory can fit.
- If it can't, see if you can add another disk or document.
- If you can't do that either, you're out of luck.

2 – Choose Cycle Time

The second step is to look at the cycle time of your computer. Let's suppose that this is 1 microsecond. You open your core manufacturer's catalog and look for the next faster core cycle listed. This is the memory you are interested in. That is to say, if you have a 1-microsecond machine, and the core manufacturer offers cycle times of 600 nanoseconds, 800 nanoseconds, and 1200 nanoseconds, you should choose 800 nanoseconds. It has to be at least as fast as your present machine. It does not matter, or help, if it is a bit faster. But your extra money is not entirely wasted, because slowing the cycle time definitely helps the reliability – something worth paying for.

3 – Find Bits/Word

The third and last step does involve checking the computer manuals. You must determine just how many actual bits are required for each byte or word. This is not the programmer version. Programmers deal only in data bits, but engineers (and at the moment, you are acting as an engineer) deal also with safety bits. These involve parity bits that check whether the data is safely there. The core manufacturer will undoubtedly help if you are feeling nervous about looking at your own manuals.

. . . And Memory

By multiplying bits/byte (or word) by the number of bytes (or words) you need, you determine how many bits are needed to form the memory you want. Again using the core manufacturer's list, you select the unit with the next highest number of bits. That is, if you need 3 million bits, and he makes them at 1 million, 2 million, and 4 million, you will have to pay for the full 4 million. Of course, if he makes a 3-million-bit system, you're in luck.

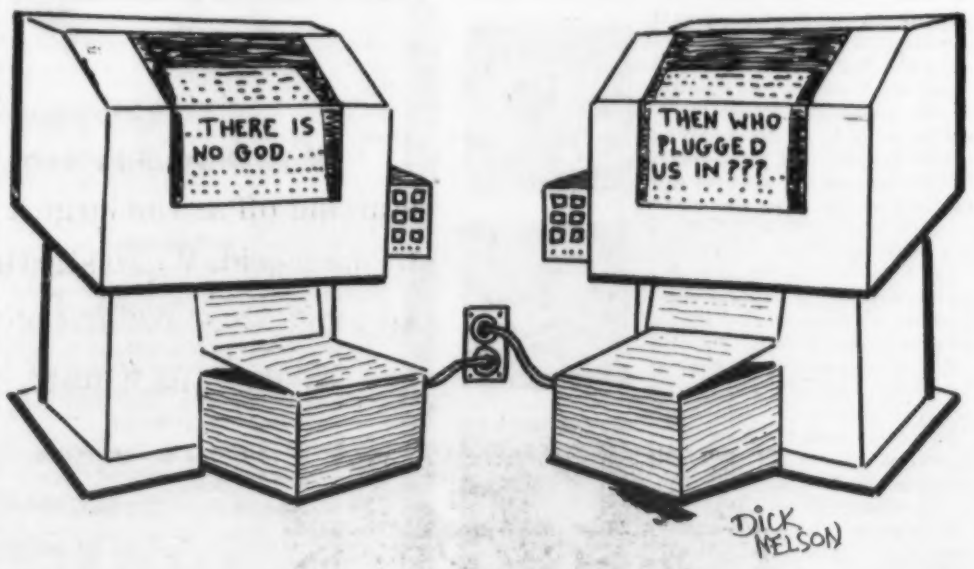
Attaching the Memory

Your last problem is deciding where to put the memory. You can, of course, add it to your own and treat it just as you would an ordinary piece of memory. This means that the addressing structure restricts you to the amount of memory for which the machine has been built. Or, you can pretend it is a peripheral, such as a disk or a document. All you need is an address. You don't have to replace the ones you have, you just need a specific address.

Generally speaking, getting it as an extended memory is better. This reduces the programming problems.

But there are alternatives that generally require you to do some reprogramming. It's up to you whether or not it is worth it.

There are many memory manufacturers, but so far, only Ampex, RCA, and Lockheed have announced their interest in providing memories to fit other computers. If you start looking for such a supplier, it might be as well to begin with them.



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Key Entry Shines at DPMA's Montreal Show

By A.B. Williams
CW Staff Writer

MONTREAL – At a DPMA show, you might expect a predominance of input/output devices. A DP manager probably has a working installation, so he's pretty well locked into a processor, systems software, and at least a concept of user program design. His show should demonstrate ways of raising throughput or lowering unit cost.

And that's just what the DPMA show did last week. It offered a wide variety of input devices. Most were keyboard-to-tape or disk, but there were even a few new keyboard-to-card units.

Tape and disk cleaners or certifiers also drew a good deal of attention. And there was the expected number of terminals, including one incorporating a Bull-GE, on-line punch and a standard ASR-33 Teletype.

But keyboard input stood out, whether the output was on cards, tape, disk, or to communications lines.

Another Input System With Own Processor

Among the new systems on display was a key-to-drum-to-tape or disk system with its own special processor.

The Key-Edit system has 4 to 32 keyboards on-line to the processor. Records of 80 to 200 characters are stored in a buffer, for format and validity checking, prior to being output to a drum. Input from one keyboard is kept discrete from the others by a process of dynamic allocation.

From the intermediate drum, the records are stored for computation, on computer-compatible tape or disk.

The edit is a process of formatting and checking the record for preset parameters (such as record length range and shift) prior to writing on the drum. The company has designed this to relieve the computer of functions such as validity checking.

The developer, Consolidated Computer Services, says the edit function saves the power of the computer for computation. Errors are located prior to entry, and displayed on an alpha-numeric display.

The company, located at 48 Yonge St., Toronto, Canada, quoted the price of an 8-station system at $1,900 per month, including 9-channel tape output. Each additional key station is said to cost $100 per month.

Deliveries of production units are scheduled to begin in eight to ten weeks. The company also has a sales office in High Point, N.C.

LC-720 Given Live Demonstration

The Logic Corp. LC-720 system [CW, Aug. 28] was working at the show. It offers either tape or disk output, tape-to-printer capability, one-pass verification, and the ability either to pool from several input units to one output or to write several outputs from a single keyboard.

The system includes a Varian 602i computer. A 10-terminal system costs more than $10,000 per terminal, but a 50-terminal system scales the per-terminal cost down to the $3,000 to $3,500 range.

Key-to-Cassette Unit Has CRT Display

A keyboard-to-cassette device that includes a CRT for easy verification was demonstrated by Sycor.

The basic device, the Model 301, is a one-for-one unit, with one keyboard outputting to one cassette. Standard features include full display of records of variable length up to 200 characters. It can be programmed, on a separate cassette, to accept instructions directing program choice and record length from the keyboard. The 301 leases for $150, with a purchase price of $7,000.

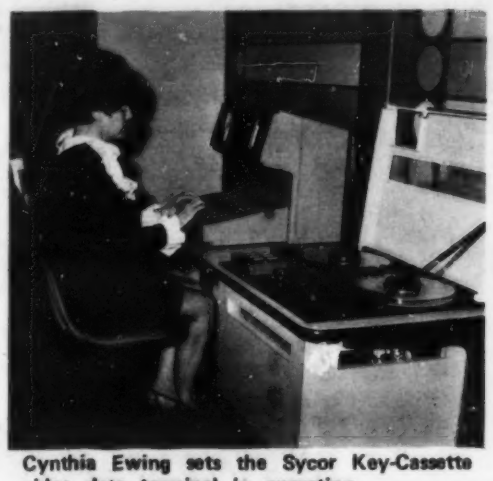
The second device, the Model 302, adds another cassette, on which selected records or parts of records can be copied. The 302 sells for $7,900 or can be leased for $170.

The converter, the 352, adds the capability of transcribing cassettes to IBM 360-compatible 1/2-in. tape. This device has a listed purchase price of $5,100 and a lease price of $130 per month.

Sycor, Inc., of 117 N. First St., Ann Arbor, Mich., says that the units are in full production.

Maurice Jeffery reviews on-line input with operators at the Key-Edit installation.

Ron Lawson demonstrates how the tape cartridge fits into the MAI-100 data transcriber.


Cynthia Ewing sets the Sycor Key-Cassette video data terminal in operation.

Gary Tischler inputs data to the Logic Corp. LC-720 key disk system.

Data Transcriber Uses Computer Tape

A rather simple device, in concept, is the MAI Model 100 data transcriber.

This is a one-for-one unit, on which one keyboard gets one tape cartridge output device. At least for now, MAI (not the manufacturer) appears to be going for the smaller-volume shop, which has no requirement for large quantities of pooled data.

The Model 100 has a true-character (as opposed to octal or binary) display that shows 99 (optionally 199) character records with column information. The keyboard is said to be similar to the standard 029 and to eliminate unnecessary retraining.

Standard times include an incremental record counter, left zero fill, 556 or 800 bit/in. recording, and a take-up spool. Optionally, the user can have features like double length (199 character) records, counter, and check digit.

The basic 7-channel unit, Model 100-01, leases for $145 per month, which puts it right in the ballpark with competition like the Honeywell Keytape unit.

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Key-to-Card Shines Again In DPMA Show 'Revival'

MONTREAL – After a couple of years of proliferating key-to-tape and key-to-disk systems, key-to-card seemed almost forgotten. It came back into its own at the DPMA show.

The Punchmaster unit, from CalComp, was the first on exhibit at the show entrance.

The company claims that one user has realized better than 60% improvement in production after 90 days' use, plus a two-to-one error-reduction rate.

The unit, in effect, becomes part of the user's keypunch equipment, which can also be used in standard fashion if the user requires.

Punchmaster is basically a 22-program memory and a buffer that stores up to 31 keystrokes. The company says the buffer can be refilled at typing speed and will accept new information while the automatic mechanical functions, such as card feed, are occurring.

The 22-program feature is said to enable one operator to key all of the cards that may arise from one source document, rather than having several operators doing one card each, all the way down the line. This approach should be a great aid to batch balance, the company says.

Memory and buffer lease for $95 per month.

As an option, there is an operator-instruction panel, a training-oriented device that displays information such as shift, program number, column number, and procedural instructions. This costs $15 per month.

Left zero fill, with or without a two-field accumulator, is also available. Without accumulator, the lease price is $10 per month; with it, the option leases for $35.

Lead time is quoted at six to nine months. Prices include training and CalComp maintenance. Keypunch equipment is separately serviced.

Another punch device demonstrated at the show was the Datafinder 400. It also features program memory and the usual left zero fill and error options.

One item of note: the user can have a read-board that features programmable illumination of 2,352 separate positions.

The basic Datafinder 400 has 15 program levels that can optionally be increased to 31.

The manufacturer, Tab Products Co., 633 Battery St., San Francisco, has priced the unit in the $65-140 range, depending on options. Delivery is said to be about 90 days after receipt of order.

Dennis Sullivan and Leta Gibson discuss the new CalComp Punchmaster that speeds conversion of source data to punched cards.

Sue DeSimon checks out the Tab Datafinder 400 keypunch and memory unit.

Blazing lights highlight the various exhibits on the floor of the Place Bonaventure in Montreal. (CW Photos by Farmer)

DPMA Show Was Smaller, But Offered Wide Aisles, Carpets, and Tranquillity

MONTREAL – The DPMA show didn't look as big as the Spring Joint Computer Conference holocaust. It wasn't, by some 25%.

And there were fewer big exhibits.

Some of the comparison was most obvious from the gallery – half the available floor space wasn't used.

In addition, the aisles were wider and well-carpeted. The latter attribute was very welcome to people who spent a good deal of time walking around.

Montreal exhibition people appeared to be well-organized and even had trustworthy records of what had arrived and its current location. When something was on the loading dock, they knew that it was there and not somewhere else.

Perhaps best of all, there were no food stands to contaminate the place with dead pizza and the general smell of grease.

Whether it was the wide aisles, fewer attendees, or no showoffs whacking computers with sledgehammers, the noise level was low, and movement through the hall was quite easy.

Occasional crowds did gather around one young lady, who was ballyhooing Univac. It may have been the products (which were also at SJCC) or the miniskirt that attracted her audience.

Some booths were nearly deserted. They seemed, in general, to be the ones that lacked bilingual presentation. One exhibitor made the mistake of emphasizing the English-speaking nature of the product.

Despite an occasional noisy or miniskirted display, the main thing that made the DPMA show different from Spring Joint was the lack of carnival – no big, heavy balloons; no free records; very little planned loudness, even in the elevators. Pretty good, given the "bring the wife and kids" nature of the show.

After Some Problems, a Pleasant Visit

MONTREAL – Late Sunday night, just before the Data Processing Management Association show opened, there were quite a few disgruntled people in Montreal – people who had been delayed and discomforted by overbooked airline reservation systems.

That was the last real trouble most visitors had. Montreal is well set up to handle large numbers of people, and has 12 hotels close to the exhibition hall.

The city goes all out to make the visitor comfortable. Hotel service is excellent. Underground shopping galleries make things easy for the tourist who has forgotten almost anything smaller than a phone booth (but larger than a matchbox).

Most of the restaurants are excellent and don't strain the expense account too badly. The only hectic occasion is breakfast, but one is well rewarded, since the "crepes" (translated "pancakes") don't come straight out of the box.

The least expected pleasure was the ride on the Metro. What a subway, after a life spent in underground filth, heat, and humidity. The trains are fast, clean, and comfortable.

"No space left," was the only answer Northeast Airlines was able to give over thirty-five people with confirmed reservations on this flight to Montreal from Boston.

Continuing Action Was the Key Result Of Computer Social Implications Talk

MONTREAL – Plans for continuing action were the key result of a DPMA seminar on the social implications of computers.

Nearly 80 people attended the seminar, and only a few left during the coffee break. They had been told that only people prepared to take action were invited to return after coffee, and a number of them came and suggested specific types of action.

Danger to Society

Behind the actions, there was an acceptance of the idea that computers involve a potential danger to society. The argument that computers are just a tool was discussed and dismissed as comparatively irrelevant.

Actions suggested included the provision of computer time and assistance to "good work" causes. This came from a Portland, Me., firm that has been supporting high schools in this manner for some time. Another specific recommendation involved educating the computer profession to the need for action and the dangers of computers. This was to be accomplished through various organizations such as ACM and DPMA.

Another suggestion was to remind the profession that humanity, as well as efficiency, is in need of programming. A speaker from the floor strongly emphasized this point. He said that it was the responsibility of the professional to emphasize the humanity necessary in applications, because this ordinarily would not be done by management.

The use of specific groups to handle the problems in particular applications was stressed. It was suggested that rather than holding general seminars, such as the one in progress, that small groups of people were needed who would deal with a specific point, like the problem of data banks, and keep themselves informed of relevant events while trying to inform others of the results. Other groups could deal with credit, etc.

Other suggestions included one that specific legislation was needed to ban computer exchange of information without the approval of people affected.

Panelist William Horn, assistant vice-president of USM, volunteered $100 a year for five years to help support some of the actions and said he was urging DPMA at the international level to help keep things moving.

At the end of the meeting, a mailing list was established so that people could keep abreast of other activities. The session chairman, Alan Taylor, editor of CW, said that as his contribution to the needed action, he would run this mailing list on a personal basis, not connected with his newspaper activities. Anyone can be placed on the mailing list by writing to him at 633 Central St., Framingham, Mass. 01701.

Magnetic tape cleaner-evaluator is demonstrated by IBM representative at the DPMA show in Montreal.

College Joins Time-Sharing Network

LANCASTER, Pa. – The Middle Atlantic Educational and Research Center, Merc, has announced that Lebanon Valley College, Annville, Pa., has joined the regional time-sharing computer network system.

Lebanon Valley becomes the ninth Central Pennsylvania education or research institution to be a member of this system.

Paul D. Newland, Merc president, said the center will provide sophisticated third-generation computer capacity for educational instruction, technology, and research.

Hub of the center, located at Franklin and Marshall College here, is an RCA Spectra 70/46 computer. It is expected that the system will be installed early this fall and will be operative before the end of the year.

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New Magnetic Tape Cleaner Is Shown

MONTREAL – A magnetic tape cleaner-evaluator that sells for $34,700 (no leasing) was displayed by IBM at the DPMA show.

The Model 3010 is available for three-month delivery in the U.S. only, according to IBM representatives at the display.

The 3010 looks like an ordinary tape drive. No literature was available, but the specifications are like this: 200 in./sec in both directions; the first operation is cleaning; the second is a flux change on the top of the oxide, to create an electrically neutral situation; the final operation is evaluation, in which permanent read errors are spotted because they have an identifiable flux.

All of these operations occur in one pass. Errors can be located by pinpoint holes on a card punched during the evaluation process. This need not be a part of every run.

The IBM people demonstrating it were very careful to state that it was designed specifically to simulate the physical specifications of IBM tape transports and heads, and that a potential non-IBM user should do a very careful job of matching specifications.

Company Services Bad 1316, 2316 Disks

CLEVELAND – The servicing of defective 1316- and 2316-compatible disks is the business of a new company, formed here as subsidiary to a disk pack leasing operation.

This type of service could take the disk manufacturer completely out of the service and replacement cycle.

The organization is called Magnetic Resources, Inc. At its Cleveland center, the firm said it will test and clean or replace bad disks in a pack, replace top and bottom, if necessary, and return recertified packs to the customer.

The cost of cleaning, balancing, testing, and reassessing a standard six-pack is quoted at $40. Disk replacement costs $40 for the first platter, with a top of $120 for three or more. Service on 20-surface disk packs costs $70, with replacement at $100, maximum $225, according to M. H. Emmerich, company president.

He also said that the operation is aimed at a seven-day turnaround time and that the service is already in operation.

The company is located at 21330 Center Ridge Road, Cleveland, Ohio 44116.

Peripheral's Peripheral Bows at DPMA

MONTREAL – A peripheral's peripheral was the featured item in a demonstration of digital plotting devices at the DPMA show here.

The apparent redundancy is explained thus: a plotter is used peripherally to an off-line tape unit.

The developer of the plotter makes some interesting promises and claims:

- Free maintenance of "housekeeping software" for five years.
- An improvement of 10 to 40 times in both computer time and tape usage.

The second claim is based on special software said to avoid the usual requirement of a separate program character to represent each of a series of repeated plotting steps.

The developer, Houston Instrument, 4950 Terminal Ave., Bellaire, Texas, says that a line length of up to 30 steps can be specified by one character. Further, a "repeat" function can be used to give another 30 times factor. Thus, the company says that an effective 900-step plot can be the result of a four-character program unit.

The system is built around a Mohawk 700 (or 900) Data Recorder. Thus, a keyboard can be used for direct data entry. MTR-9 can be purchased for $22,000 in the nine-track version or can be built from an already owned MDS unit, to save the cost of that device.

The company, a division of Bausch & Lomb, has three plotters, any one of which can be used in the system. They differ in step size, increment rate, and paper width. The special software and maintenance appear to be available with any of the three.

The developer will quote lease prices. Delivery of all hardware is stated to be 30 days.

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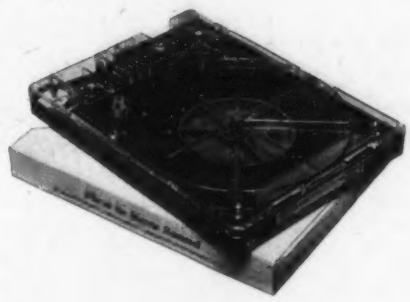

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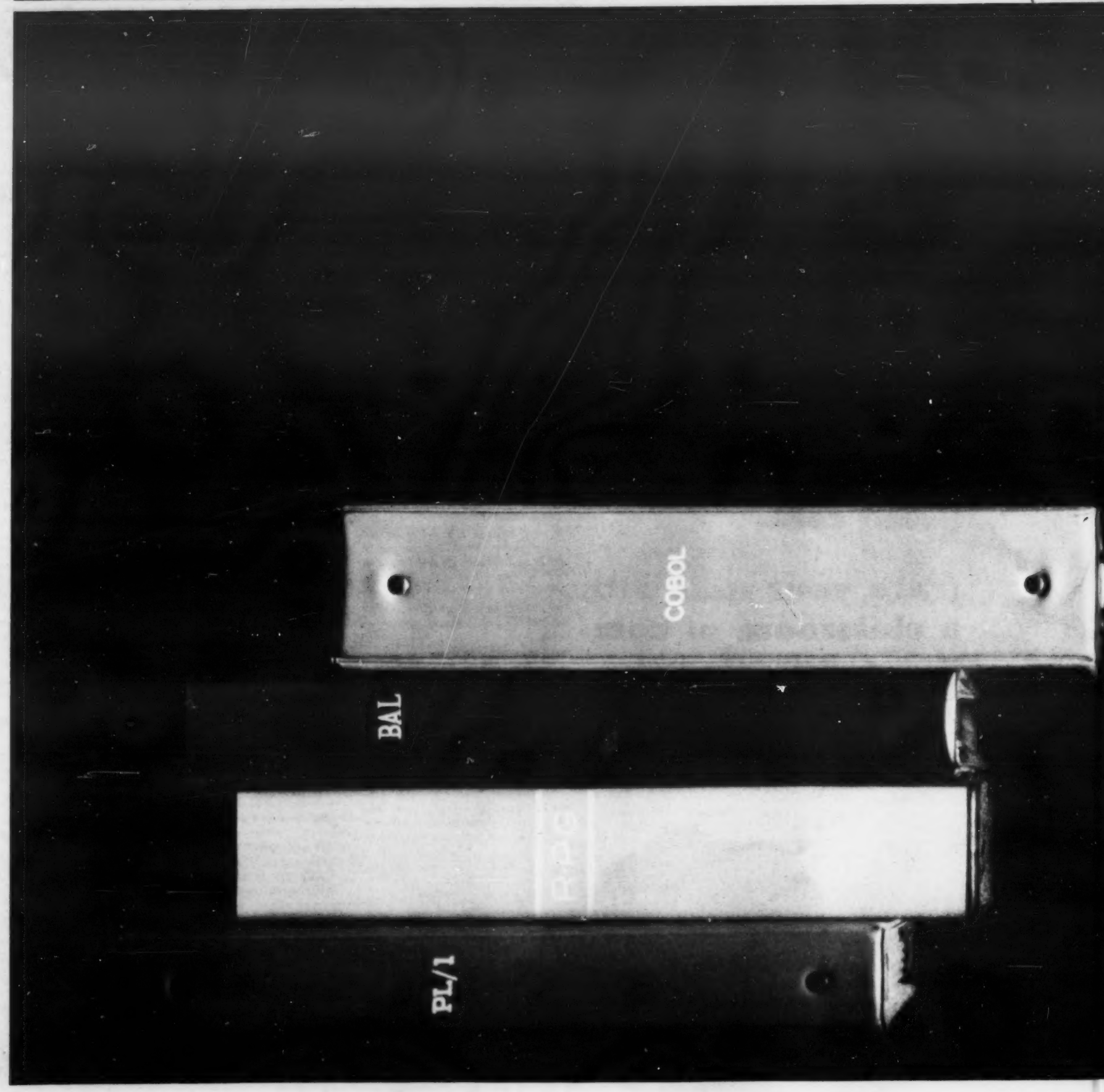

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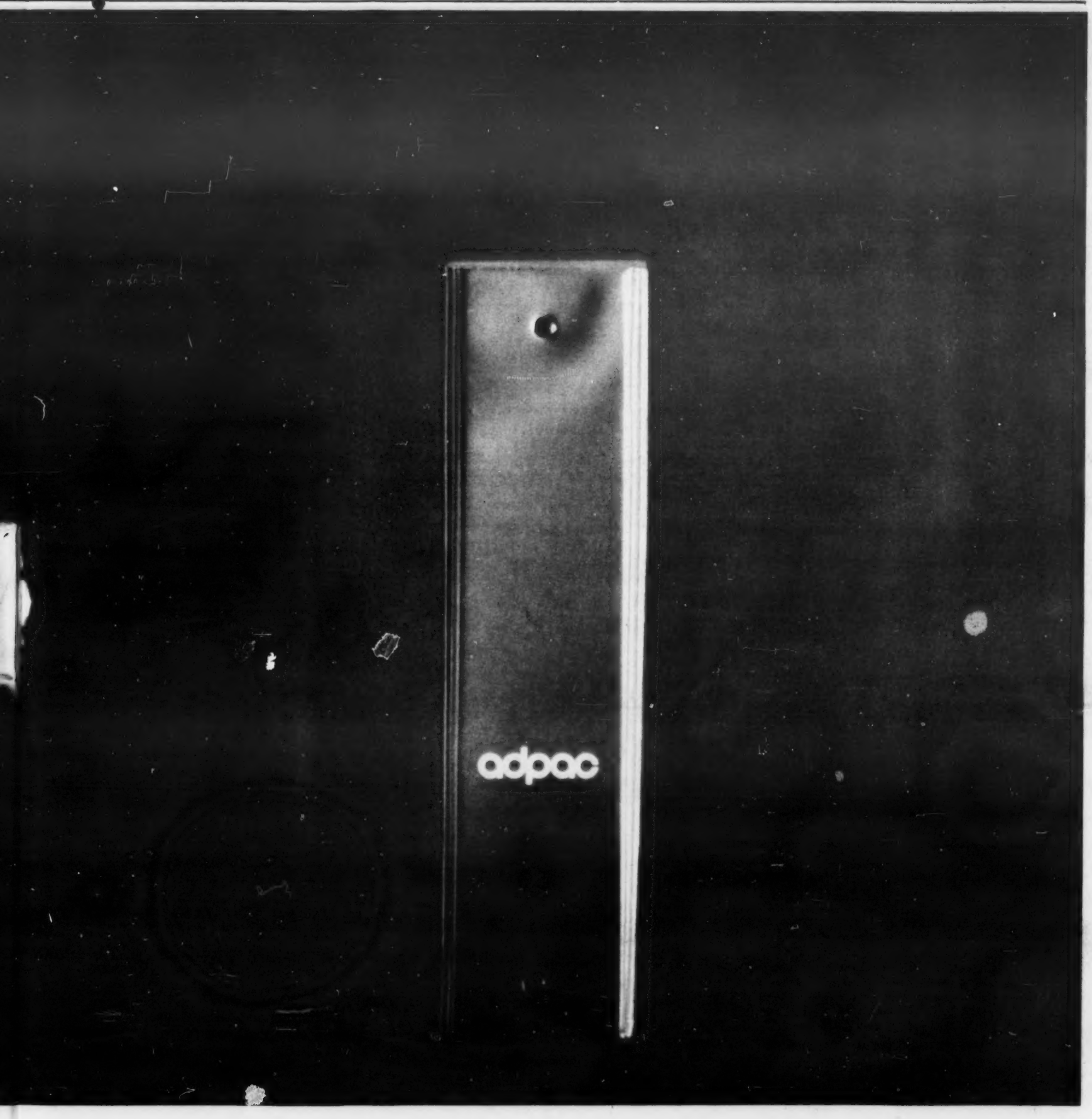

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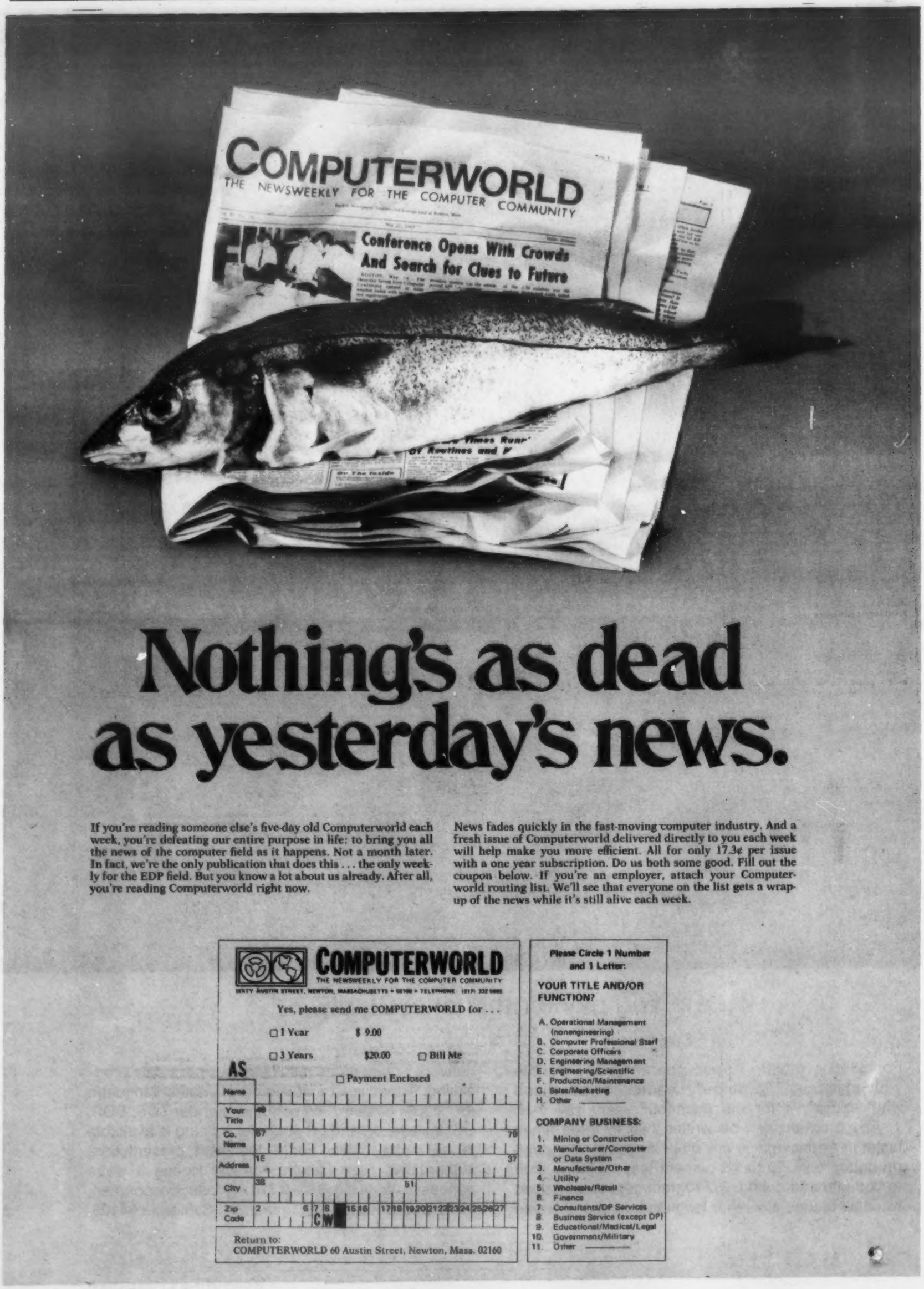

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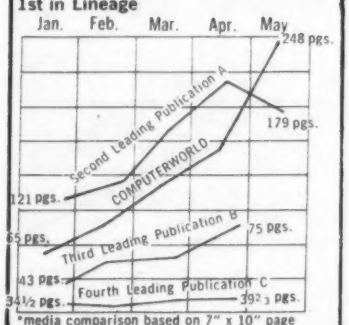

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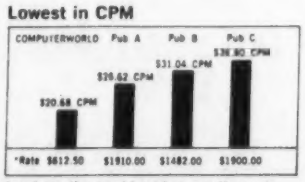

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(1) MAGNETIC DISK OR DRUM STORAGE SYSTEMS, OR
(2) ON-LINE INVENTORY CONTROL SYSTEMS.

RE: UNITED STATES PATENT NO. 2,611,813
FILED MAY 26, 1948 AND ISSUED SEPTEMBER 23, 1952 TO TECHNITROL, INC., PHILADELPHIA, PENNSYLVANIA, FOR A MAGNETIC DATA STORAGE SYSTEM

NOTICE OF PATENT INFRINGEMENT RELATING TO THE ELECTRONIC DATA PROCESSING FIELD AND NOTICE OF MOTION TO ESTABLISH A PATENT INFRINGMENT CLASS ACTION

I. TO ALL WHO HAVE BEEN ARE OR MAY BE CLAIMED TO BE INFRINGERS OF UNITED STATES PATENT NO. 2,611,813

Notice is hereby given that in the following actions in the United States District Court for the District of Maryland, on April 17, 1969, Technitrol, Inc. filed a Motion For Leave To File Consolidated Amended Complaint which, if granted, would establish a consolidated class action, under Rule 23 of the Federal Rules of Civil Procedure, in which all infringers and contributory infringers of U.S. Patent No. 2,611,813 would be Class Defendants and would be bound by any judgment therein:

(1) *Technitrol, Inc. v. Control Data Corporation*, Civil Action No. 17653;

(2) *Technitrol, Inc. v. Honeywell, Inc.*, Civil Action No. 18317;

(3) *Technitrol, Inc. v. Scientific Data Systems, Inc.*, Civil Action No. 19515.

The proposed Class Defendants are all those who have directly infringed, contributorily infringed, or induced the infringement of, any claim of U.S. Patent No. 2,611,813; except those licensed under the patent to perform what would otherwise be an infringement in the absence of such license. The issues common to the proposed class are validity, coverage and enforceability of U.S. Patent No. 2,611,813.

Those who may be proposed Class Defendants may obtain from the undersigned copies of the Motion For Leave To File Consolidated Amended Complaint and the accompanying Consolidated Amended Complaint.

In an Order dated May 23, 1969, the Honorable R. Dorsey Watkins, United States District Judge of the United States District Court for the District of Maryland, Baltimore, Maryland 21202, extended the time within which all Defendants and proposed Defendants may reply to the Motion For Leave To File Consolidated Amended Complaint up to and including June 30, 1969. In view of the lack of notice, Plaintiff will not oppose any request to the Court to extend the time to reply up to and including July 30, 1969.

II. NOTICE OF INFRINGEMENT

Notice of infringement is hereby given to each and all of the following:

(a) Whoever without authority makes, uses, leases or sells (or has made, used, leased or sold) any invention (or its equivalent) claimed in U.S. Patent No. 2,611,813, within the United States prior to and including September 23, 1969 (and thereby infringes the patent).

(b) Whoever actively induces (or has actively induced) infringement of said patent (and thereby is liable as an infringer).

(c) Whoever leases or sells (or has leased or sold) a component of any such claimed invention (or its equivalent) constituting a material part of such claimed invention, knowing the same to be especially made or especially adapted for use in an infringement of said patent, and not a staple article or commodity of commerce suitable for substantial noninfringing use (and thereby is liable as a contributory infringer).

III. CLAIMS OF U.S. PATENT NO. 2,611,813

The foregoing notice is given with respect to all twenty-four claims of U.S. Patent No. 2,611,813, which define the claimed inventions and their equivalents. Suppliers of magnetic disk or drum storage systems, or material parts thereof, should particularly note claims 9, 16 and 19 reproduced below. Suppliers of on-line inventory control systems, or material parts thereof (including programs), and users of on-line inventory control systems, should particularly note claims 5 and 21 also reproduced below.

9. In an information storage system, movable recording means including a plurality of registers for temporarily storing numerical information, means for producing different register-selection voltage combinations representative respectively of said registers and occurring successively in timed relation to said movable recording means, and means under control of an operator for selecting any one of said registers through the agency of said voltage combinations.

16. A system for magnetic storage of a plurality of data respectively relating to different items of information, comprising a magnetic member having a plurality of magnetizable data storage portions respectively assignable to said different items of information, a magnetic recording and reading device adjacent to said magnetic storage member for selectively magnetizing any of said data storage portions for storing data thereon or alternatively for taking a reading of data previously stored thereon, means for transmitting signals including item selection signals to said storage apparatus, means for causing continuous relative rotation between said magnetic storage member and said magnetic recording and reading device for continuously scanning said plurality of data storage portions, circuits separately operable through said magnetic recording and reading device for causing the device to record or read as desired, selective means responsive to the received signals for rendering a desired one of said circuits operable, and means including a gating circuit having space discharge tubes and whose timing is controlled by the received selection signals and the instantaneous position of said recording and reading device relative to that of a data storage portion selected, thereby to effect a desired recording or reading operation.

19. In an information storage system, magnetic recording means having a plurality of information recording sections constituting registers and also having a register-selection section on which are recorded pulses coordinated with said registers, means for producing from said recorded pulses different successively-occurring register-selection voltage combinations representative respectively of said registers, means under control of an operator at a remote position for producing a group of pulses indicative of a particular register and also containing numerical information which it is desired to store in that register, means responsive to some of said pulses for producing a pattern of voltages, means responsive coincidently to said voltage combinations and said voltage pattern for selecting said register, and means for storing said numerical information in said register.

5. In an information storage system, a central station, a plurality of operating stations, a transmission line extending from each of said operating stations to said central station, a plurality of operating positions at each of said operating stations, a plurality of registers at said central station adapted to receive numerical information and to have such information erased therefrom, means under control of an operator at any one of said positions at any one of said stations for producing and sending over the line of said station a group of pulses indicative of a particular register and also containing numerical information which it is desired to store in that register, means for preventing transmissions over the lines of the other stations during the operation at said one station, means for preventing operations at the other positions of said one station during the operation at said one position, means at said central station responsive to said pulses for selecting said register, means operable upon selection of said register for indicating at said one position whether or not any number already stored in said register plus that to be stored exceeds a given number, and means operable only in the event that said given number will not be exceeded for erasing the number already in said register and for storing therein the sum of the erased number and the additional number which it is desired to store.

21. In an information storage system, spot magnetization recording means including a plurality of registers adapted to receive numerical information and to have such information erased therefrom, means under control of an operator at a remote position for producing a group of pulses indicative of a particular register and also containing numerical information which it is desired to store in that register, means responsive to said pulses for selecting said register, means operable upon selection of said register for indicating whether or not any number already stored in said register plus that to be stored exceeds a given number, and means operable only in the event that said given number will not be exceeded for erasing the number already in said register and for storing therein by spot magnetization the sum of the erased number and the additional number which it is desired to store.

Anyone may obtain a copy of U.S. Patent No. 2,611,813, and thereby a copy of the remaining nineteen claims, from the Commissioner of Patents, Washington, D.C. 20231, upon payment of fifty cents.

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Software Protection on Agenda of IIA

WASHINGTON, D.C. – Copyright and Related Protection for Information Age Products will be the topic of a meeting of the Information Industry Association to be held at Airlie House, Warrenton, Va., July 18 and 19.

A presentation to open the subject of protection of computer software will be made on July 18 by IBM.

They will submit their proposed registration system for computer programs. The system is similar to copyright and includes the disclosure of concepts of the program, but not the detailed instruction.

There will also be sessions in which copyright authorities will propose revisions to copyrights and other systems.

The Information Industry Association, a recently formed trade group of commercial firms that market information products, has called the two-day meeting to analyze the application of copyright and other laws originally written for the earlier age of ink-print technologies.

Those interested in participating may file a membership application, conditioned on the adoption of the amendments by the association membership at the meeting.

For further information contact Paul G. Zurkowski, Executive Director, Information Industry Association, 1025 15th St. N.W., Washington, D.C. 20005.

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School to Offer Systems Training

CLEVELAND – The Cleveland Engineering Institute will expand into the computer-systems training field beginning this fall.

The new computer systems training division will be jointly operated by Cleveland Engineering Institute and Progressive Data Management Corp.

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New Management System Is Proposed for Lawyers

PHOENIX – A law-office system providing both money management and business management for lawyers has been announced jointly by Information Network Corp. and the local law firm of Moore, Romley, Kaplan, Robbins and Green.

Currently under development, the system is intended to provide the information necessary to allow partners in a firm to keep track of time spent on each case, revenue involved, charges to be made, and actions to be taken in specific cases.

The time spent by each attorney, how it was spent, how much time was spent on overhead, and case-by-case breakdowns by attorney and firm will permit better management for groups of lawyers, the two firms said.

The system will produce accounts receivable, revenues, detailed expenses, and profits for the period displayed, they said. Attorney workloads, profitability by type of business, and growth-projection data will also be supplied on demand. Future planned extensions for the system include production of P/L statements, balance sheets, and equity-position reports for members of the firm.

Incorporated into the system, through its existence on INC's time-sharing service, is a text editor, expected to save significant time in preparing briefs and legal documents. The system provides password protection, which the company feels will prevent unauthorized access to each attorney's files. No date for completion has yet been predicted.

Project Control Program Offered As Part of DP Engineering Service

PORTLAND, Ore. – Project, a computer program for project control, is now available from EDP Central, Inc. The program is the fourth to be offered by the Portland-based computer time-sharing firm as part of the Integrated Civil Engineering System (Ices).

Three more Ices programs remain to be installed in the company's IBM 360/50 computer, according to project coordinator Kenneth C. Rozas, a civil engineer. Rozas described Project as a critical path method for logistical control of engineering tasks, including the scheduling of manpower, equipment, and materials. "Every job that can be represented by a network of work items and associated requirements can be processed by Project," he said.

Rozas explained that time-sharing enables the project engineer to access a computer from his own field office over telephone lines. "Because the computer uses standard project-control jargon, the engineer doesn't waste time learning a new language to make it work for him."

Ices was developed at MIT with the cooperation of the National Science Foundation, the U.S. Department of Transportation, IBM, and other private and public institutions. In addition to Project, it includes programs for coordinate geometry, structural analysis, settlement, and road-building, all of which now are available from the company.

The answer to every engineer's dream! An automatic drafting machine that produces drawings having an error no greater than 0.005 inches in twenty feet. It is used to test NC tapes and make drawings with NCCS' new Action service.

Drawings Digitized, NC Tapes Produced

CLEVELAND – Action, a new service offered by Numerical Control & Computer Services, provides the ability to produce any type of numerical control tape for production of machined parts, as well as to transfer production information directly from engineering drawings. The system also produces precision drawings on the company's new Decamatic-ESP drafting machine. NCCS is a division of the Eugene Dietzgen Co.

The operation permits the production of repetitive drawings, such as those used for specific parts which are needed in many assemblies, and is capable of producing all types of perspective projections, three-dimensional drawings, and rotated views of any object.

The system verifies all output tapes by producing precision drawings of the tooling instructions stored on the tape and comparing them, by machine, with the original drawing. Operating at up to 400 in./min, the Decamatic can be programmed to produce any type of grid desired as an overlay, as well as specialized types of drawings, such as performance diagrams, isometrics for perspective, tooling-pattern reports, and topographical maps.

Drawings are input through the use of digitizers, shown in the photograph. The "programmer" traces the drawing with a "mouse" that reads the lines and produces their numerical equivalent under program control. Any type of drawing can be processed, and any of the services offered can be performed from this step, according to NCCS.

Raps Information Retrieval System Can Be Compiled 2 Different Ways

BETHESDA, Md. – An information retrieval system with built-in report-writing and data-processing capabilities has been developed by Leasco Systems and Research Corp. Known as Raps, the system is intended for business, statistical, and scientific use, Leasco reported.

Minimum requirements for the system are a 360/20 with 32K, but it will run on any member of the S/360 line. The user is allowed to create functions tailored to his needs and incorporate them through the use of an equivalent to the CALL macro.

Two interpreters make up the Raps system. One transforms high-level, report-specification and processing-requirement statements into programs, sorting instructions, and report-writers. The other compiles the specifications into Fortran source language, allowing the scientific user to adapt the program for coping with special circumstances and for making his own logical programming part of the package

The system price of $12,000 includes documentation, source code, and maintenance. It can be leased for $500 per month with a $3,000 installation charge.

Test Files Created for Debugging

BURLINGTON, Mass. – Pro/Test, a computer system designed to aid the debugging of programs by simple production of test data files is now available from Synergetics Corp.

Available on either S/360 or Honeywell 200 equipment, the package comes with a 100-page user manual for installation and guidance in its use.

The firm, located here on Second Ave. at the Northwest Industrial Park, provides consulting and contract programming services.

Pro/Test is comprehensive, according to the company. The file can be created in ascending or descending sequence, with up to nine levels of control breaks. Records can be fixed or variable length, blocked or unblocked. An unlimited number of records can be created. Fields within records can be defined as random, sequential, or constant or can contain user-specified values.

The program is easy to use, the company says. The system parameters are defined with the Pro/Test forms in which operands are specified in free-form notation with extensive defaulting of parameters. It is a documented approach to testing, in which the report reflects all parameter errors as well as documents all parameters used, whether defaulted or specified. It can print the entire generated file or selected portions of it.

Fourth Version of RSVP Released by NCI

PHOENIX – The fourth version of RSVP, National Computing Industries' report-preparation and information-retrieval language, has been released.

Oriented towards a form language, RSVP is intended to provide management with easier access to information stored through the use of computer systems.

System Can Serve Several Airlines

DALLAS – A fully automated passenger-name record reservation system can now be shared by regional and territorial airlines. The system does a complete reservations job, including inventory, availability, flight information, incoming and outgoing Teletype handling, schedule display, name storage, and record policing.

Shares, offered by Mutual Computer Services, Inc., uses dual IBM 360/65 computers and the same basic programming package adopted by most major U.S. airlines, IBM's programmed airline reservation system, Pars.

According to D.R. Hankins, company president, Shares is different from other Pars installations in that it is simultaneously servicing several airlines through a single computer complex, with each user unaware of another's participation.

Text Processor Now Handles Page Layout

WHITE PLAINS, N.Y. – Publishers and printers using the IBM 360 Text Processor program will be able to do page layout in addition to typesetting and copy editing.

The layout capability will become available with a new program module, Pagination 360, announced by IBM.

Text Processor is designed for use by periodical and book publishers and organizations that produce directories, manuals, and journals. Three modules of the text-handling system were announced previously – Composition/360, Hyphenation 360, and Edit 360. The new module includes all the features of the three earlier programs plus the added layout capability.

ACS Markets 'Fair'

PROVIDENCE, R.I. – The Fair package [CW June 18] is available from Applied Computer Sciences, a local firm, not from NCR. The $5,000 price includes documentation and a source deck.

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Point-of-Sale Credit Card Transactions To Be Handled by New Remote Service

MIAMI – A computer-linked system that will provide instant credit card transaction approval at any cash register in any store in the U.S. has been announced by Computer Controls Corp. here. According to J. Robert Park, senior vice-president of the company, the key to the operation is the direct tie-in of each register by phone to the company's centralized, time-sharing complex.

The new system, he reports, is called Post (point-of-sale throughput) and is used at the point of sale to read credit cards, update an accounts receivable file, check credit, and check for lost or stolen cards or returned merchandise, according to Park.

The "black box," as Park has dubbed the system, was developed to the company's specifications by an electronics manufacturing firm and has been successfully used for the first time in a demonstration of time-sharing credit control using a credit card, according to Park.

"A major benefit of Post for companies using the system will be a dramatic improvement in customer relations," Park said. Studies, he noted, indicate that after a customer has selected his merchandise for purchase and presented his credit card to the clerk, an overall average time lapse of 7.8 minutes occurs before the customer can go on his way. This causes a major bottleneck in the flow of customers around the cash register. Post eliminates this problem by doing away with the necessity of waiting an extended length of time for the completion of a transaction.

"The unique feature of Post is that the system can be used any place in the country. As a charge transaction occurs at any cash register in any store, the regular store credit card, specially encoded, is fed into the black box. Information is transmitted to the central computer complex in Miami, and credit approval or rejection of the purchase is received by the black box located at or near each register within 10 to 15 seconds, thereby providing an extremely large marketing base," he said.

Computer Controls Corp. intends to apply for a patent for the Post software.

Post will also provide its users with substantial cost reduction and absolute control over their accounts receivable and billing operations, according to Park.

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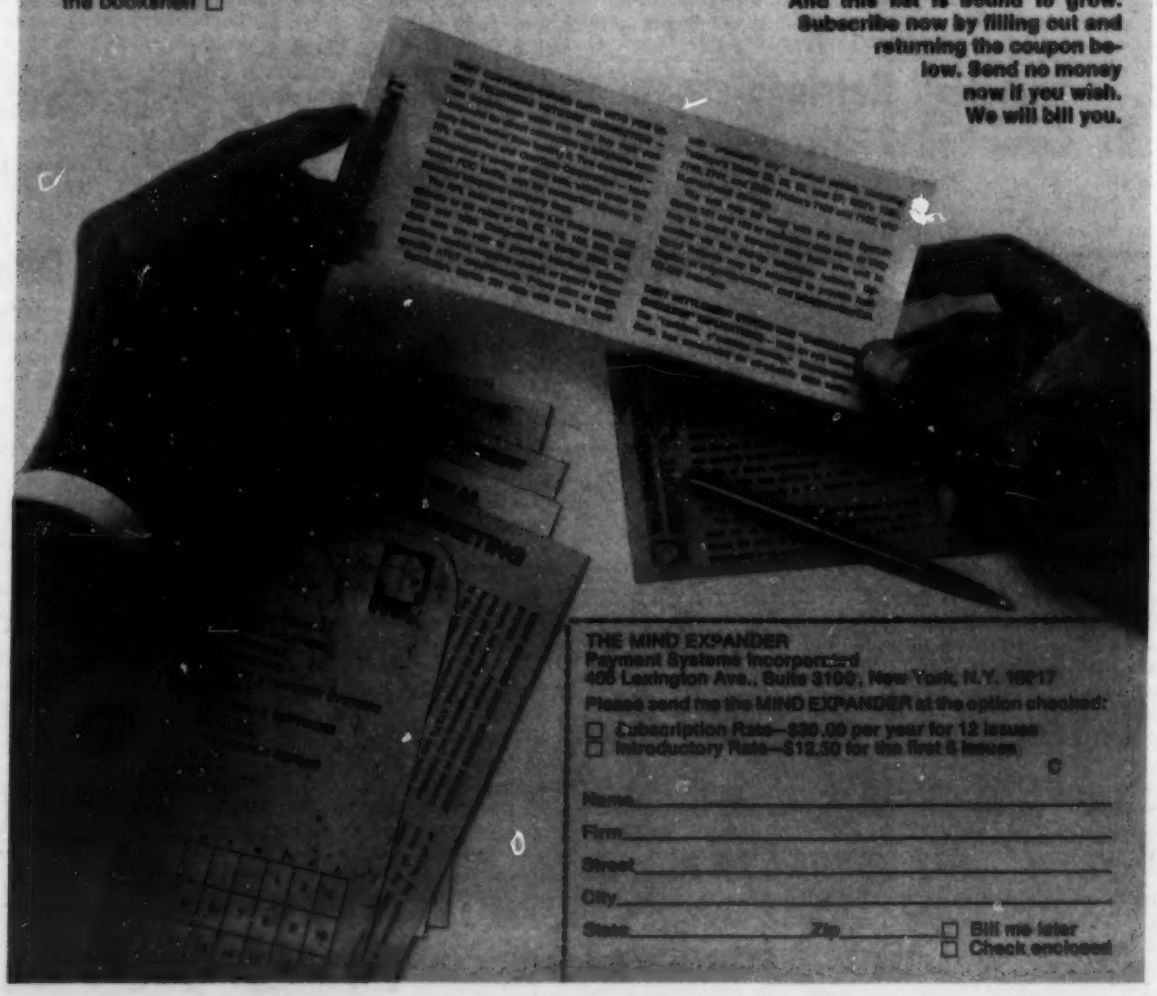

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ITT Quote System

A stock quotation system using closed-circuit TV has been supplied to the London Stock Exchange by a British subsidiary of International Telephone and Telegraph Corp. Stock price changes are keyed into a central computer at the exchange and are almost instantaneously transmitted by closed-circuit TV to the offices of 250 brokers. The system, using some 800 television receivers and control units, was supplied by ITT's Standard Telephones and Cables Ltd. for about $400,000.

Major Computer Companies Seen Safe From Economic Slowdown

NEW YORK – The major computer companies have little to fear from current industry uncertainty or a possible economic slowdown, says Paine, Webber, Jackson & Curtis, nationwide investment firm.

"We remain optimistic about the long-term prospects" of well-established, diversified computer-oriented firms, writes security analyst Robert A. Sullivan in a research report released during June. He recommends the group for investors seeking long-term capital appreciation.

Computer revenues, which have been growing dramatically, are expected to increase at an annual rate of 15% to 20% over the next five years, Sullivan says.

Despite the impressive earnings strides made recently, he adds, however, computer stocks have done very little.

As a result, according to Sullivan, many issues seem reasonably priced in relation to their growth prospects. He is especially enthusiastic about IBM, 327; National Cash Register, 129; and Sperry Rand, 52.

Paine, Webber's optimistic outlook for computers includes the following points:

• Although computer shipments are down slightly, most computers are leased, and rental revenues continue even if the number of new installations levels off or declines.

While there were less than 15,000 systems shipped during 1968, down from 1967, there were nearly 70,000 computers in use at the end of 1968 versus about 58,000 at the beginning of 1968 – a 20% increase.

• Eventual settlement of current antitrust suits against industry giant IBM might create an opportunity for most other major producers to increase their market share, but at the same time, it is doubtful that IBM would have to agree to any compromise that would severely limit its own growth potential.

• Computer earnings should hold up relatively well, even if anti-inflationary moves lead to a slowdown of the economy. This is due to the stability of rental revenues and because the product is becoming an essential cost-savings tool for a broad spectrum of users, not all of whom are influenced by business cycles.

• IBM's anticipated "unbundling" – price restructuring to separate charges for hardware from those for software or programming applications – should have no major impact on either IBM or other leading firms.

Sullivan added that he expects "IBM to begin charging separately for hardware, applications software, customer support, education, and maintenance.

"While total unbundling may not be covered in the initial announcements, we believe eventually it will come." he said.

Sullivan predicted that while software, peripheral, and service companies see unbundling as a great opportunity to increase their market share, it will not have a major impact on IBM.

"But it will provide much greater flexibility to adjust prices as needed.

"For example, maintenance costs have been rising rapidly in recent years, but IBM was not able to increase its charges due to fixed contracts. In the future, it may be able to do so."

Another factor, Sullivan stressed, was that the great majority of computer users would prefer to rely on a single reliable source for its total data-processing needs. Hence, IBM is likely to retain the lion's share, even with unbundling, and with its great volume, financial strength, and experience, is likely to be able to offer the fullest line, and lowest prices and costs of any segment of the business.

Computer Short Interest Up

By a CW Staff Writer

NEW YORK – Short interest on both the American and New York Stock Exchanges dropped sharply during the month ended June 13, as selected computer companies' short interest increased for the same period.

Short interest on the NYSE increased by 3,244 to 1,244,792 from 1,241,548 the previous month.

Short interest on the American climbed 3,345 to 599,547 from 596,202 in the previous month.

A short sale is the sale of borrowed stock.

The seller generally anticipates a price drop that will enable him to repurchase an equal number of shares at a lower price.

The short interest is the number of shares not repurchased for return to lenders and represents, in effect, a definite backlog of potential buy orders.

The following tables show the New York and American Exchange stocks in which a short position of at least 20,000 shares existed on June 13 or in which there was a short position change of at least 10,000 shares since May 15, 1969.

NEW YORK STOCK EXCHANGE		
Amer Photocopy	68,160	91,750
Amer Research & Dev	24,007	23,522
Bunker Ramo	23,668	33,646
Burroughs Corp	83,487	84,641
Computer Sciences	59,726	55,628
Control Data	155,820	157,862
General Electric	22,328	17,007
IBM	55,625	56,448
Leasco Data	232,095	225,859
Memorex	30,315	39,434
RCA	30,117	30,221
Sanders	23,412	20,147
Scientific Resources	73,098	71,788
Sperry Rand	107,402	114,028
Xerox	255,532	219,567
AMERICAN STOCK EXCHANGE		
Astrodata	66,986	81,687
Compudyne	21,877	24,700
Data Process	51,088	40,086
Fin Gen		
Data Prod	215,512	225,702
Dearborn Comp	26,102	380
Leasco Data wts	45,265	28,761
Levin-Town Comp	101,306	124,969
Mohawk Data	47,488	52,285
Telex	23,923	17,632

Europeans Plan to Build Super Computer

WASHINGTON, D.C. – The American Embassy in Paris has forwarded information on a plan for the development of a European super computer to the U.S. Department of Commerce, Business and Defense Services Administration.

Saul Padwo, director of the Scientific, Photographic and Business Equipment Division said:

"According to the French newspaper *Les Echos* and other French sources, five European-based firms and one British firm have been holding discussions on the construction of a super computer: Siemens and Telefunken of Germany, Phillips of The Netherlands, Olivetti of Italy, the French Compagnie Internationale pour l'Informatique (CII), and the British firm International Computers Limited (ICL).

"The outcome of these discussions will be presented to the Council of Ministers of the Six, European Economic Community, early this July.

"The planners hope to capitalize on increased European demands for giant computers during the 1975-1980 period at which time the European super computer is scheduled to come off the assembly line.

"The plan is based on the realization that only a continental-sized market could absorb the heavy research and development costs entailed in producing a super computer.

"Otherwise, as pointed out by *Les Echos*, this market would fall to American firms which 'presently have a world monopoly in the domain of giant computers.'"

"As well as recapturing a market essential to development of defense, the plan is described as opening vast possibilities on the European scene.

"The plan is viewed as a "locomotive project" designed to draw advanced technology and to deeply affect research and industry, even 'leading to the restructuring of European industry.'"

SSI Computer Becomes ITEL After Merger

SAN FRANCISCO – On June 12, stockholders of SSI Computer Corp. and Statistics for Management Data Processing Corp., New York, overwhelmingly approved an agreement to merge the two companies.

Stockholders also approved changing the name of the merged corporation to ITEL Corp. SSI Computer and Statistics for Management will become operating divisions of ITEL Corp. Headquarters for ITEL will be in San Francisco.

Terms of the merger agreement call for SSI shareholders to receive one share of ITEL Corp. common stock for each SSI common share held.

Statistics for Management shareholders will receive 1.5 shares of ITEL Corp. for each SFM common share held.

Officers of ITEL Corp. will be drawn from both SSI and SFM. Fred H. Merrill will be chairman of the board; Leon Weisburgh, chairman of the executive committee; and Peter S. Redfield, president and chief executive officer.

Vice-presidents of ITEL will be Gary B. Friedman, R. Douglas Norby, and Murray L. Pfeffer.

In addition to approving the merger, shareholders also authorized an increase in the common stock of ITEL Corp. from 6,000,000 to 10,000,000 shares and approved issuance of a new class of 500,000 shares of preferred stock, $1 par value.

Commenting on the expected benefits of the merger, Redfield said that SSI's geographic diversification would provide a base for expansion of SFM's computerized accounts receivable and payroll services to major cities in the U.S.

At present, SFM serves 700 businesses in the greater metropolitan New York and Philadelphia areas. SSI Computer, the largest lessor of IBM System/360 computers, has regional sales offices in Atlanta, Chicago, Dallas, Los Angeles, New York, Pittsburgh, and Toronto.

Redfield said that ITEL Corp. will embark upon a diversification program upon completion of the merger. He said it is presently anticipated that ITEL will seek additional businesses engaged in computer-related activities that will complement ITEL's present business.

The common stock of ITEL Corp. has been approved for listing on the American Stock Exchange upon completion of the merger.

PSC to Distribute Stock

NEW YORK – Programming Sciences Corp. is planning a special distribution of stock in its privately held affiliate, Consolidated Software, Inc., to PSC shareholders.

The distribution to PSC shareholders of record on July 15 will be on the basis of one share of Consolidated Software for each 10 shares of PSC, according to Albert M. Loring, PSC president.

The plan has the approval of the PSC board of directors, he said.

Loring said that the distribution will allow PSC's shareholders to benefit "from the constantly expanding software packaging markets, in which we believe Consolidated Software will have an important role." The stock distribution will be made as soon as possible after the record date.

Consolidated Software was organized earlier this year to operate independently in marketing software packages, including those developed by PSC.

Dow Jones Index Down 2%

CW Main Index Only Down 1.5%

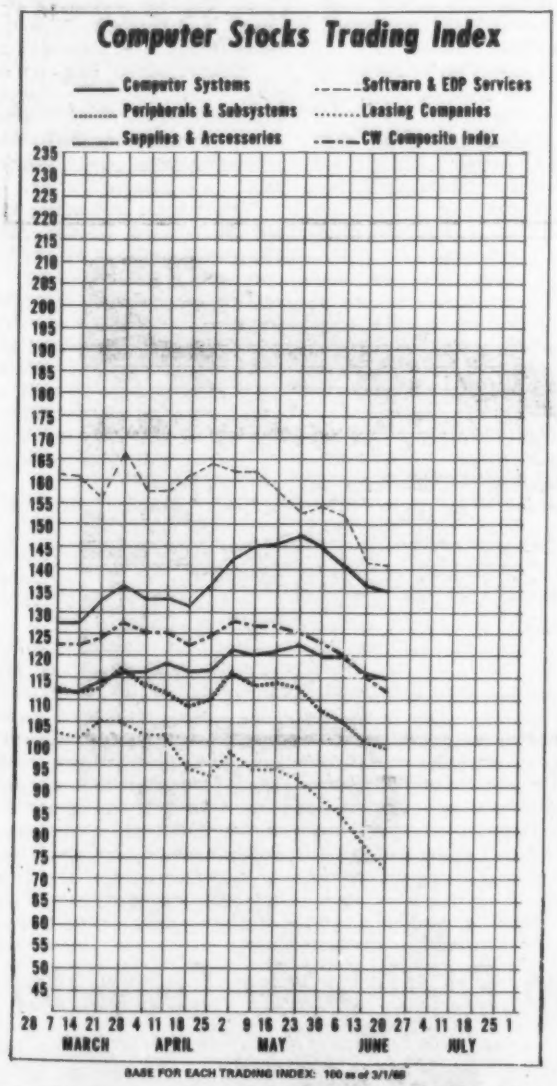
By A.B. Williams
CW Staff Writer

Sag? This time it was a raft of new lows in the Peripherals & Subsystems sector in the week ended June 20. There was one new high – that was in Xerox' split stock. But nearly half (12 of 25) of the issues hit new lows, and seven closed there.

The sector as a whole suffered a very minor (under 1%) loss; it did, however, close below the March 1, 1968 level, which is the 100% point. A few index stocks went up. In point of fact, three of the six gainers in the group were in the index.

Taken as a whole, the week ended June 20 saw the Dow Jones industrial average slide more than CW's composite index, by 2% as opposed to under 1.5%.

The major loser, again, was the Leasing sector, which lost 6.1%, closing at slightly less than 75% of base. Eight hit new lows, five for the second week in a row, and three (Leasco, Lectro, and MAI) for the third.



BASE FOR EACH TRADING INDEX: 100 as of 3/1/68

Unbundling

One of the major points of doubt affecting the market, particularly the leasing and software companies, has been unbundling. The cat now is mostly out of the bag.

IBM has separately priced non-systems software, system engineering, and education; and talks of lowering hardware costs by some 3%. Field engineering was left alone, as far as separate pricing of hardware maintenance. Field software support has been priced, with rates depending on the complexity and level of professionalism required of the support people.

Thus, the hardware maintenance function, one of the major bones of contention with the leasing companies, has not yet been broken out. The pattern is there, but settlement of the details has been left in abeyance until the end of the year.

These actions may tend to make things a bit tighter for the leasing companies. The net effect on the average user will probably be a somewhat more expensive job of getting on the air, with education, systems help, applications software, and compilers all adding to the cost of creating a working installation.

For software companies, there's a bit of waiting involved. Only 18 programs have been priced, as yet. Others will be priced as new versions are released, with the full new prices to wait until the end of the year.

The software companies that are involved at or near the operating system level are probably a little disappointed, if not in the least surprised. A number of firms have been in and around that level. A number more are competing with IBM's utility packages. While they now have priced products to compete with, they still have no assurance that their products will not be disabled by future versions of operating systems.

Leasing companies are over one hurdle, though. IBM software will be available; the price will be the same from user to user, and the guy with multiple CPUs will pay the same software dollar per CPU as the one-machine installation. Each unbundled piece (each copy of the same compiler, sort, or whatever) will have a serial number, and each processor will have its unique number. A piece of software will be used with only the one processor to which it is assigned.

Computers: What's their future?

The special Review and Forecast issue of *EDP Industry Report,* just published, contains a valuable analysis of the explosive computer industry at a time when there are significant transitions occurring in the EDP market.

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COMPUTER STOCKS: TRADING SUMMARY

COMPUTER SYSTEMS

EXCH	1969 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
N	135-120	127		BURROUGHS CORP	+ 1 3/4	1.40
N	69- 46	47		COLLINS RADIO	- 1/4	-.53
N	159-125	140		CONTROL DATA CORP	- 1/4	-.18
A	281-138	189		DIGITAL EQUIPMENT	---	---
N	25- 17	17	1/4	ELECTRONIC ASSOC.	- 1 1/8	-6.12
N	98- 85	90	3/8	GENERAL ELECTRIC	- 1 1/8	-1.23
N	95- 75	85	7/8	HEWLETT-PACKARD CO	- 1 3/4	-2.00
N	148-107	128		HONEYWELL INC	- 1	-.78
N	334-291	312	1/4	IBM	+ 3/4	.24
N	139-108	120	1/2	NCR	- 4 1/2	-3.60
N	48- 41	41	7/8	RCA	- 1 3/4	-4.81
N	58- 31	31	7/8	RAYTHEON CO	- 1 7/8	-5.56
O	43- 24	29	3/4	SCI. CONTROL CORP.	- 3/4	-2.46
N	55- 44	50	3/4	SPERRY RAND	+ 1 1/4	2.53
A	36- 26	30	1/2	SYSTEMS ENG. LABS	+ 1/8	.41

PERIPHERALS & SUBSYSTEMS

EXCH	1969 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
N	82- 65	71		ADDRESSOGRAPH-MULT	+ 1/4	.35
O	71- 24	24	1/4	ALPHANUMERIC	- 2	-7.62
N	44- 32	39	1/8	AMPEX CORP	- 2 5/8	-6.29
O	19- 13	13		BOLT,BERANEK & NEW	- 3/4	-5.45
N	17- 11	11	1/4	BUNKER-RAMO	- 5/8	-5.26
A	37- 26	26	1/2	CALCOMP	- 4 1/8	-13.47
O	38- 23	26	1/2	COGNITRONICS	- 2	-7.02
A	16- 9	10	1/4	COMPUTER EQUIPMENT	- 2 3/4	-21.15
A	27- 14	14	3/4	DATA PRODUCTS CORP	- 1/4	-1.67
O	22- 13	14	1/4	DIGITRONICS	+ 1/2	3.64
O	62- 46	52		ELECTRON MEMORIES	+ 1/2	.97
O	12- 9	9		FABRI-TEK	- 3/8	-4.00
O	37- 28	28		FARRINGTON MFG	- 2 3/4	-12.09
O	21- 14	14		INFORMATION DIS	- 1/2	-3.45
A	34- 20	24		MILGO ELECTRONICS	- 1 3/4	-6.80
A	82- 59	75	1/2	MOHAWK DATA SCI.	- 3/4	-.98
O	118- 54	58		OPTICAL SCANNING	+ 4	7.41
O	29- 18	18		PHOTON	- 2 1/2	-12.20
A	35- 27	28	5/8	POTTER INSTRUMENT	- 5/8	-2.14
O	76- 54	59	1/2	RECOGNITION EQUIP	+ 2 1/2	4.39
A	22- 18	19	3/4	RIXON ELECTRONICS	- 1/2	-2.47
N	61- 28	28	5/8	SANDERS ASSOCIATES	- 4 3/4	-14.23
O	85- 41	41		SCAN DATA	- 9	-18.00
O	36- 20	20		TALLY CORP.	- 1	-4.76
N	275- 86	89	5/8	XEROX CORP	+ 3	3.46

SUPPLIES & ACCESSORIES

EXCH	1969 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	47- 32	38	1/2	ACME VISIBLE	---	---
N	22- 14	14	1/4	ADAMS-MILLIS CORP	- 1 1/8	-7.32
O	27- 23	25		BALTIMORE BUS FORM	- 1/2	-1.96
A	29- 18	20	1/2	BARRY WRIGHT	- 3/4	-3.53
O	44- 34	34		DATA DOCUMENTS	- 1	-2.86
N	42- 36	36	1/2	ENNIS BUS. FORMS	- 1/2	-1.35
N	89- 65	77	1/8	MEMOREX	- 5 1/2	-6.66
N	112- 94	104		3M COMPANY	+ 1/2	.48
O	37- 29	32	3/8	MOORE BUS FORMS	+ 1/2	1.57
N	46- 36	39		NASHUA CORP.	- 1	-2.50
O	48- 36	38		REYNOLDS & REYNOLD	---	---
O	31- 23	28	1/2	STANDARD REGISTER	- 1	-3.39
N	36- 28	33	3/8	UARCO	- 5/8	-1.84
A	20- 13	13	3/8	WABASH MAGNETICS	- 1 1/4	-8.55
O	34- 29	33		WALLACE BUS FORMS	+ 1 1/4	3.94

SOFTWARE & EDP SERVICES

EXCH	1969 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	14- 7	7	3/4	ADVANCED COMP TECH	+ 1/2	6.90
O	39- 31	31		APPLIED DATA RES	- 5	-13.89
O	19- 7	7	3/4	ARIES	- 3/4	-8.82
A	83- 63	72		AUTOMATIC DATA PRC	- 2 3/4	-3.68
O	13- 7	8	1/4	AUTO SCIENCES	---	---
O	17- 10	11	3/4	BRANDON APPL SYS	+ 3/4	6.82
A	21- 14	14		COMPUTER APPL	- 1/2	-3.45
O	16- 7	7	1/2	COMPUTER ENVIRON	- 1	-11.76
O	47- 30	30		COMPUTER NETWORK	---	---
N	75- 49	61	1/2	COMPUTER SCIENCES	- 1 3/4	-2.77
O	40- 16	16		COMPUTER USAGE	- 1	-5.88
A	56- 37	42	3/4	COMPUTING & SOFT	- 2 7/8	-6.30
O	24- 9	9	1/2	DATAMATION SERVICE	- 1 3/4	-15.56
O	17- 8	9		DATATAB	+ 1/4	2.86
O	15- 6	6	1/4	DIGITEK	- 1 1/4	-16.67
A	38- 20	23	3/4	ELECT COMP PROG	- 1 3/8	-5.47
O	30- 20	24		INFORMATICS	- 2 1/2	-9.43
O	19- 4	4	1/2	MATRIX CORP.	- 1	-18.18
O	22- 9	12		NAT COMP ANALYSTS	+ 2 1/2	26.32
A	33- 23	28	5/8	PLANNING RESEARCH	+ 3/8	1.33
O A	11- 8	8		PROGRAMMING & SYS	---	---
O	10- 6	7	1/4	SOFTWARE SYSTEMS	---	---
O A	37- 8	10		STRATEGIC SYS	+ 1 1/2	17.65
O	36- 11	22	1/2	TBS COMP CENT INC.	- 3	-11.76
O A	12- 5	5	3/4	UNITED DATA CENTER	- 1 1/4	-17.86
O	155- 68	69		UNIVERSITY COMP	+ 1	1.47
O A	38- 27	27		URS SYSTEMS	- 2 1/2	-8.47
O A	16- 10	10		U.S. TIME-SHARING	- 2	-16.67

LEASING COMPANIES

EXCH	1969 RANGE	CLOSING PRICE			WEEK NET CHANGE	WEEK % CHANGE
O	45- 29	29	1/8	BOOTHE COMPUTER	- 5 7/8	-16.79
O	18- 9	9		COMPUTER EXCHANGE	- 1	-10.00
A	34- 13	15	1/8	COMPUTER LEASING	+ 7/8	6.14
O A	14- 8	12	1/4	CONT COMPUTER	- 1 1/8	-8.41
O	12- 8	8	1/4	CYBER-TRONICS	+ 1/4	3.13
A	60- 31	32	7/8	DATA PROC. F & G	- 2 3/8	-6.74
O	16- 7	7	3/4	DATRONIC RENTAL	- 1/2	-6.86
A	52- 36	39	1/4	DEARBORN COMPUTER	- 1	-2.48
O	16- 10	10	3/4	DPA, INC.	- 5/8	-5.49
A	45- 26	26	1/4	GRANITE EQUIPMENT	- 2 1/4	-7.89
A	28- 16	16	1/2	GREYHOUND COMPUTER	- 1/4	-1.49
N	50- 29	29	5/8	LEASCO DATA PROC.	- 3 3/4	-11.24
O	9- 5	5		LECTRO COMP LEAS	- 1	-16.67
A	57- 29	29	3/8	LEVIN-TOWNSEND CMP	- 3 1/8	-9.62
O	8- 4	5		LMC DATA, INC.	- 1/2	-9.09
O	14- 5	5	7/8	MANAGEMENT ASSIST	- 5/8	-9.62
A	39- 28	28	1/4	NATIONAL EQUIPMENT	- 4 1/2	-13.74
O A	12- 6	6		NCC LEASING	- 1/4	-4.00
A	43- 22	23		RANDOLPH COMPUTER	- 1 1/4	-5.15
O	34- 11	11	1/2	SYSTEM CAPITAL	- 1	-8.00
A	28- 15	15	5/8	U.S. LEASING	- 2 7/8	-15.54

New Registrations

PLANCO SYSTEMS AND DEVELOPMENT CORP., 1740 Cherry St., Philadelphia, Pa. 19103, a company offering a broad range of land planning and computer services, filed to register 125,000 shares of common stock.

Proceeds, at $5 per share, intended for the initial development of programs, advertising, and marketing, working capital, and other purposes. No underwriter is involved.

COMPUTER PROFILES, INC., 246 B W. Bute St., Norfolk, Va. 23510, a company engaged in the business of designing, installing, and implementing EDP systems for the advertising industry, filed to register 250,000 shares of common stock.

Proceeds, at $10 per share, intended for the initial design, development, and programming of the Comprofile and Comprofio systems, for advertising and public relations, for installation, implementation, and maintenance of the Comprofile and Comprofio, systems for the establishment and equipping of branch offices in Atlanta, Chicago, Los Angeles, and New York, and for research and development. No underwriter is involved.

FISCAL MANAGEMENT SYSTEMS, INC., 160 Broadway, New York, N.Y. 10038, a company engaged in offering fiscal and specialized management services in areas relating to data processing, systems design, and personnel training, and anticipating the establishment of a time-sharing service center, filed to register 200,000 shares of common stock. Proceeds, at $2.20 per share, intended to establish and staff a computer service center in New York and for other related purposes. The underwriter is A.J. Carno & Co., Inc., 42 Broadway, New York, N.Y.

DATRON SYSTEMS, INC., Mountain Lakes, N.J. 07046, a company engaged in the design, manufacture, and sale of certain types of computer peripheral equipment consisting principally of automatic time clock punches, plastic identification badge punches, tabulating card punches, card reading and transmission equipment, and data acquisition equipment, filed to register 250,000 shares of common stock.

Proceeds, at $10 per share, intended for the establishment of additional manufacturing facilities and the acquisition of production equipment and inventory, for staffing and equipment of up to eight regional sales offices, for advertising, product design, and development, and for application to the payment of equipment obligations and short-term bank loans. The underwriters are Kleiner, Bell & Co., Inc., 9756 Wilshire Blvd., Beverly Hills, Calif., and Jesup & Lamont, 26 Broadway, New York, N.Y.

COMPUTER DEDUCTIONS, INC., 1776 Broadway, New York, N.Y. 10019, a company engaged in service data processing, filed to register 150,000 shares of common stock.

Proceeds, at $5 per share, intended for payment of debentures, for the recruitment, employment, and training of six professional and technical staff members and two sales and marketing personnel, for the design, development, and marketing of a proprietary computer system, and for the establishment of offices in Norfolk, Va., and Washington, D.C. The underwriter is A.J. Butler & Co., 50 Broadway, New York, N.Y. 10004.

NUCLEAR DATA, INC., 100 W. Golf Road, Schaumberg, Ill., a company engaged in the design, manufacture, and sale of special-purpose digital computers and related equipment for collecting, processing, and recording experimental and research data, filed to register 62,500 outstanding shares of common stock.

Price is set at $23.75 per share maximum. Northwestern National Life Insurance Co. is the selling stockholder.

CENTRONICS DATA COMPUTER CORP., 61-37 Fresh Meadows Lane, Flushing, N.Y., a company engaged in leasing a computer system for use in gaming casinos, filed to register 180,000 shares of common stock.

Proceeds, at $7.50 per share maximum, intended for the purcahse of components and the manufacture of casino systems, for the establishment of a service staff, the development of service centers in key marketing areas at which a supply of major components and system modules will be maintained, for augmenting the marketing staff, for financing expanded marketing efforts, and for research and development of computer systems for hotels. The underwriters are George Robinson & Co., 5 Hanover Square, an Suez American Corp., 55 Broad St., both of New York, N.Y. 10004.

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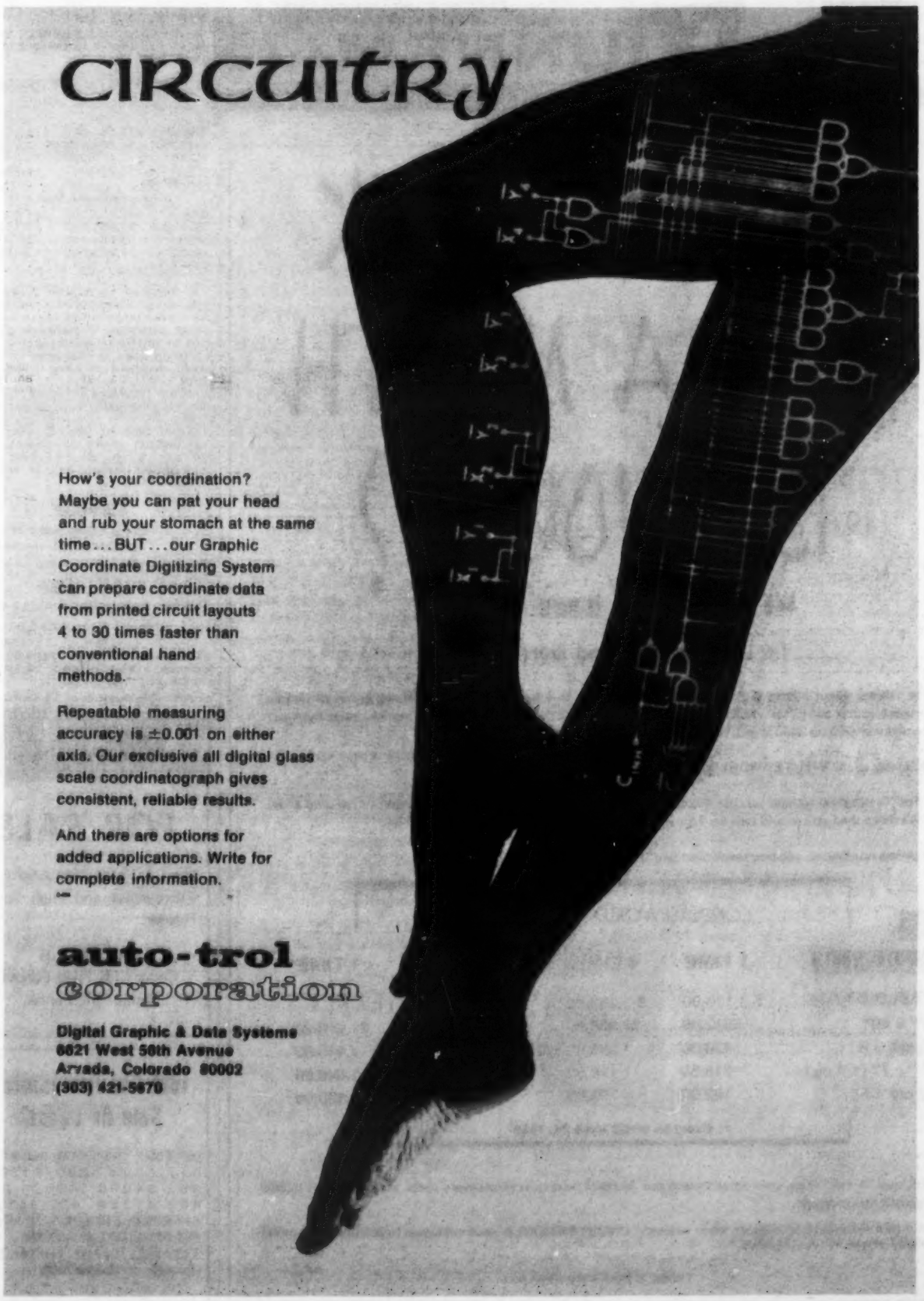

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3 col. x 8"	420.00	1,646.00	2/3 page	1,415.00
5" x 7" (1/4 pg.)	318.50	1,176.00	1/2 page	1.040.00
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Earnings Reports

DATATAB, INC.

3 Months Ended March 31

	1969	1968
Revenue	$676,594	$242,842
Earnings	29,086	11,995
Shr Ernd	.07	.05

ECPI

3 Months Ended March 31

	1969	a1968
Revenue	$643,404	$756,742
Earnings	17,512	117,447
Shr Ernd	.02	.15

a—Restated by company.

FABRI-TEK, INC.

Year Ended March 28

	1969	1968
Revenue	$15,824,146	$18,562,903
Earnings (loss)	369,463	(678,890)
Shr Ernd	.12	

INFORMATICS, INC.

Year Ended March 29

	1969	a1968
Revenue	$11,548,000	$9,125,000
Earnings	561,000	26,000
Shr Ernd	.45	b.02

a—Restated for acquisition. b—Adjusted for 2-for-1 stock split in January, 1969.

LEASCO DATA PROCESSING

3 Months Ended March 31

	1969	a1968
bRevenue	$22,084,000	$13,284,000
Earnings	10,709,000	5,657,000
bOper Inco	2,599,000	1,174,000
eOth Inco	8,110,000	4,483,000
cShr Ernd	.66	d.40

6 Months Ended March 31

bRevenue	$41,405,000	$25,200,000
Earnings	23,891,000	14,554,000
bOper Inco	5,082,000	2,243,000
eOth Inco	18,809,000	12,311,000
cShr Ernd	1.48	d1.02

a—Restated to include companies acquired on a pooling-of-interest basis. b—From information services and other activities. c—Assumes conversion of all series B preferred stock into common stock. d—Adjusted for 100% stock dividend in May, 1968, and 5-for-2 stock split in March, 1969. e—From insurance activities; includes net realized gain from investments from Reliance Insurance Co. of $6,047,000 in the quarter and $11,095,000 in the six months, compared with $1,312,000 and $4,186,000, respectively, in the like 1968 periods.

AM CORP.

3 Months Ended April 30

	1969	1968
Revenue	$108,656,000	$102,584,000
Earnings	7,303,000	6,977,000
Shr Ernd	.91	a.87

a—After devaluation gain of 2 cents.

9 Months Ended April 30

	1969	1968
Revenue	$299,033,000	$277,924,000
Earnings	15,550,000	14,093,000
Shr Ernd	1.94	a1.76

a—After devaluation of 11 cents.

ALPHANUMERIC INC.

3 Months Ended March 31

	1969	1968
Loss	$502,652	$278,107

AUTOMATIC DATA PROCESSING

9 Months Ended March 31

	1969	a1968
Revenue	$17,566,795	$12,855,210
Earnings	1,459,163	1,009,188
Shr Ernd	.93	.71

a—Restated to reflect acquisitions on a pooling of interest basis and surtax.

BOLT BERANEK & NEWMAN

9 Months Ended March 31

	1969	a1968
Revenue	$10,562,000	
bEarnings	611,000	
cShr Ernd	.22	
dSpec Cred	355,000	

a—Comparable figures not available, as this is the first time the new company has reported for the nine months. b—Equal to 52 cents per share. c—Based on income before special credit. d—From sale of foreign time-sharing interests and discontinuance of certain unprofitable operations in its domestic business.

CAVANAUGH LEASING CORP.

3 Months Ended March 31

	1969	a1968
Earnings	$1,475,609	
Shr Ernd	.62	

a—No comparisons available because of acquisitions.

COGNITRONICS CORP.

3 Months Ended March 31

	a1969	1968
Revenue	$757,249	$292,625
Earnings (Loss)	(86,160)	13,381
Shr Ernd		.01

a—Includes operations of Computer Data Corp. and the Stamford Tool & Die-Customatic Division, both acquired subsequent to March 31, 1968.

COMPUTER APPLICATIONS

6 Months Ended March 31

	a1969	b1968
Revenue	$23,558,141	$20,475,971
Earnings	182,898	325,847
Shr Ernd	.12	.22

a—Includes results of Professional Automation Group, Inc. acquired in February, 1969. b—Restated to reflect surtax and acquisition on a pooling-of-interest basis of Triton Press, Inc., Mercedes Book Distributors Corp., Arlington House, Inc., and Professional Automation Group, Inc.

COMPUTER EDUCATION INC.

9 Months Ended March 31

	1969	1968
Revenue	$1,334,282	$588,269
Earnings	117,202	39,860
Shr Ernd	.22	.08

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more TIME FOR SALE on page 22

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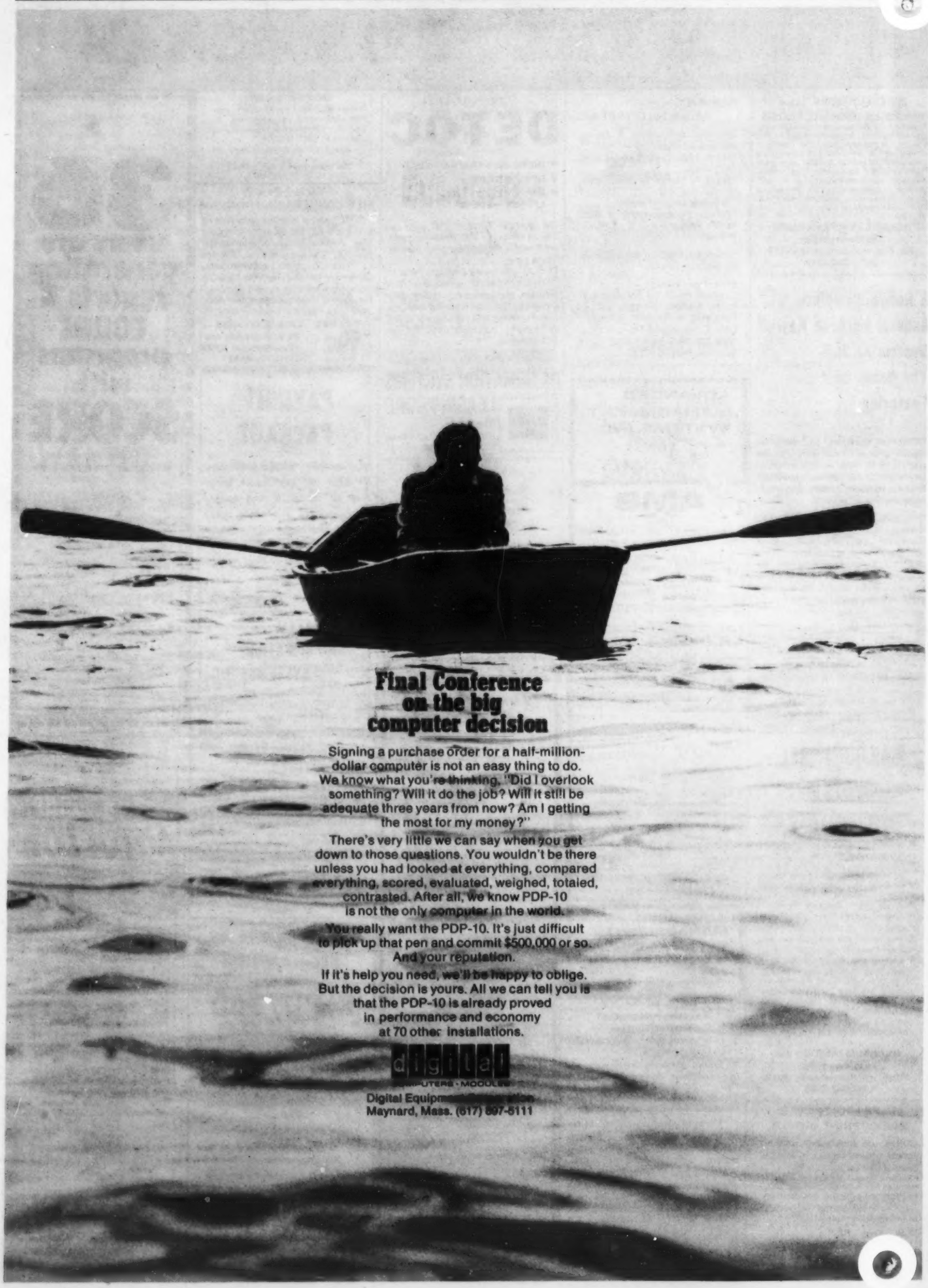

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